Lansdowne.

PSYCHOLOGICAL INQUIRIES:

IN A SERIES OF ESSAYS,

INTENDED TO ILLUSTRATE

THE MUTUAL RELATIONS OF THE PHYSICAL ORGANIZATION AND THE MENTAL FACULTIES.

BY

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"THE perceptions of the senses are gross, but even in the senses there is a difference. Though harmony and properties are not objects of sense, yet the eye and the ears are organs which offer to the mind such materials, by means whereof she may apprehend both the one and the other. By experiments of sense we become acquainted with the lower faculties of the soul; and from them, whether by a gradual evolution or ascent, we arrive at the highest. Sense supplies images to memory. These become subjects for fancy to work on; reason considers and judges of the imaginations; and these acts of reason become new objects to the understanding. In this scale, each lower faculty is a step that leads to the one above it; and the uppermost naturally leads to the Deity, which is rather the object of intellectual knowledge than even of the discursive faculty, not to mention the sensitive. There runs a chain throughout the whole system of beings. In this chain one link drags another; the meanest things are connected with the highest. The calamity, therefore, is neither strange nor much to be complained of, if a low sensual reader shall, from mere love of the animal life, find himself drawn in, surprised and betrayed into, some curiosity concerning the intellectual."

SIRIS, *A Chain of Philosophical Reflexions concerning the Virtues of Tar-water*, by GEORGE BERKLEY, D.D. Lord Bishop of Cloyne, s. 303.

PREFACE

TO

THE THIRD EDITION.

In preparing the present and the preceding edition of the "Psychological Inquiries" for the press, I have taken the opportunity of correcting whatever inaccuracies I had found to exist in the original publication. At the same time I have, in different parts of the work, introduced some new matter, the result of further reflection on the subjects which I have ventured to discuss.

Having received communications from various correspondents, I have not hesitated to avail myself of some of the suggestions which they have offered. There are others which I have not yet sufficiently considered, but of which it is probable that I may be glad to avail myself also, if I should have a future opportunity of doing so.

One of my correspondents seems to be of opinion that I have not sufficiently regarded the dignity of human nature in speaking of the minds of the inferior animals as belonging to the same mode of existence, or being of the same essence, with the mind of man. I do not myself see how any one, who does not (with Descartes) believe animals to be mere unconscious machines, can arrive at any other conclusion. I do not, however, feel that it is necessary for me to enter further into the question, as it has been fully considered by one of much greater authority than myself; and I have only to refer to the observations on this subject contained in the first chapter of the Rev. Dr. Butler's *Analogy of Religion to the Constitution and Course of Nature.*

ADVERTISEMENT.

THE subject of the present Volume, although replete with interest, and of much practical importance, is one as to which we have no means of obtaining such complete and definite knowledge as to admit of it being presented in the shape of a systematic treatise. Some points may be considered as established with a sufficient degree of certainty; there are others as to which opinions may reasonably differ; while there is still a greater number as to which we must be content to acknowledge that, with our limited capacities, we have no means of forming an opinion at all.

The method of dialogue seems to be especially adapted for inquiries of this description; and it is hoped that this will be considered as a sufficient apology for the form in which the following observations are submitted to the public.

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THE Session of Parliament was drawing to a close. Ministers took advantage of the approach of the grouse-shooting season to hurry through the two Houses the various Bills which

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century, and, like many country houses of that date, was in a low situation, with a very limited prospect. But this defect was compensated by the beauty of the surrounding country, which exhibited all that variety of picturesque scenery which a varied geological structure usually affords. On one side were steep and lofty chalk hills, covered by a scanty herbage, and dotted with yews and junipers. On another side was a still loftier hill, but of a more gradual elevation, composed of sand with a thin soil over it, and covered with heath, with some clumps of Scotch firs scattered here and there. In the intermediate valley there were fields and meadows, with stubble and green pasture, and intersected by a stream of water; while at the foot of the chalk hills, and at no great distance from the house, there was an extensive beech wood, which, from the absence of underwood, and the magnitude and height of the trees, with their branches mingling above, might be compared to an enormous cathedral, with its columns, and arches, "and dim religious light."

On our arrival we found our friend waiting to receive us, there being no one with him but some of the junior members of his own family, who joined with him in his hospitalities. During the few days which our visit lasted we saw whatever was most worthy to be seen in the surrounding country, walking, or riding, and resting at intervals for the purpose of conversation. It seemed at times as if we had gone back to the period of our early life. We expressed ourselves as freely as when we were young, having before us the unknown country which we were about to explore. Still we were sensible that we were not what we had been formerly. The world was no longer that fairy-land which our imagination was wont to furnish with its own images. We knew it, and the people in it, and we knew ourselves, better than when we began our journey. We had lost the joys of hope and expectation, but we had also lost many of the anxieties which not unfrequently obscured our brighter visions, and years had not rolled over us without leav-

ing us, in the realities of life, many worthy subjects of contemplation.

I have mentioned that Eubulus had quitted his official situation on account of the state of his health; but he had now so far recovered as to have considerable bodily activity, at the same time that he had lost none of his intellectual vigour. It was on the second day of our visit that I expressed to him the satisfaction which it afforded me to find that the experiment which he had made had proved to be so successful. I added, "It must, indeed, be delightful to you to find yourself here, where everything around you is so cheerful, with every comfort and luxury which you can wish for, and in the enjoyment of that perfect leisure which must be more agreeable from the contrast between it and the incessant exertions of your former life."

"I have reason," he answered, "to be grateful to God for the many blessings which I enjoy. But do not speak of perfect leisure as one of them. It was very soon after I was

established here that I made the discovery that it was necessary to my happiness that I should provide some new occupation for myself; and I succeeded in doing so. To those who have been brought up in idleness, a life of leisure is bad enough; and hence we find that the more energetic among them are glad to exchange it for some kind of active pursuit, — politics, travelling, field-sports, horse-racing, gambling, accordingly as their natural tastes and accidental circumstances give one or another direction to their minds. The vulgar phrase of killing time very aptly expresses the feelings of many on this subject. But if a life of leisure be painful to such persons, what must it be to one like you or me, who have advanced beyond the middle period of life, without having had any experience of it? This is no speculative inquiry; it may be answered from actual observation. Not a few persons who abandon their employments under the impression that they will be happy in doing so, actually die of *ennui*. It induces bodily disease more than physical or mental labour. Others, indeed, survive the ordeal.

But where the body does not suffer, the mind often does. I have known instances of persons whose habits have been suddenly changed from those of great activity to those of no employment at all, who have been for a time in a state of mental excitement, or of hypochondriasis, bordering on mental aberration. Moreover, it is with the mind as it is with the body — it is spoiled from want of use; and the clever and intelligent young man, who sits down to lead what is called a life of leisure, invariably becomes a stupid old man."

CRITES. You, at any rate, can have had no difficulty in finding an occupation for yourself. At school and college you made yourself not only a good Latin and Greek scholar, but also well acquainted with general literature. You have, I conclude, fallen back on your early studies; and your library, I perceive, affords you abundant opportunities of doing so.

EUBULUS. It is true that this is a great resource, and that a person who has been originally well educated, has a very great advantage over one who has been in this respect

less fortunately situated. But do not take it for more than it is worth. It must be confessed that to one who has been engaged in more active and exciting pursuits, whatever they may have been — politics, profession, commerce, or anything else — mere reading, without any specific object, is, by comparison, but dull work. In early life we read for some definite purpose, to make ourselves acquainted with a particular subject, or to obtain knowledge which is to be applied to the attainment of something that we have in view afterwards. Undoubtedly the mere acquirement of knowledge is in itself agreeable; but something more than this is necessary, not only to keep the mind in a wholesome and vigorous state, but to happiness. Not only must the mental faculties be exercised, but it must be on a worthy subject, or with some ulterior view. It was better for Diocletian to plant cabbages than to do nothing; and it is to be supposed that Charles the Fifth derived some sort of comfort from his flying puppets and self-flagellations; but I suspect that, in spite of his misfortunes, Lord Bacon

was not altogether unhappy while engaged in completing his philosophical works; and I cannot doubt that he was much less so than he would have been if he had shared the occupations and amusements of the Emperors.

CRITES. But Lord Bacon could not have been wholly and entirely occupied in the way which you have mentioned. He must still have had many hours of leisure on his hands.

EUBULUS. That is true. A man in a profession may be engaged in professional matters for twelve or fifteen hours daily, and suffer no very great inconvenience beyond that which may be traced to bodily fatigue. The greater part of what he has to do (at least it is so after a certain amount of experience) is nearly the same as that which he has done many times before, and becomes almost a matter of course. He uses not only his previous knowledge of facts, or his simple experience, but his previous thoughts, and the conclusions at which he had arrived formerly; and it is only at intervals that he is called upon to make any considerable mental exertion. But at every step in the

composition of his philosophical works Lord Bacon had to think; and no one can be engaged in that which requires a sustained effort of thought for more than a very limited portion of the twenty-four hours. Such an amount of that kind of occupation must have been quite sufficient even for so powerful a mind as that of Lord Bacon. Mental relaxation after severe mental exertion is not less agreeable than bodily repose after bodily labour. A few hours of *bonâ fide* mental labour daily will exhaust the craving for active employment, and will leave the mind in a state in which the subsequent leisure (which is not necessarily mere idleness) will be as agreeable as it would have been irksome and painful otherwise.

CRITES. And what limits do you place to mental exertion of the kind to which you allude?

EUBULUS. I do not see that it is possible to lay down rules for the mind in that respect, more than for the body; so much must depend on its original powers, on the physical condition of the individual, and on his previous

training. Those whose early education has been defective, for the most part, labour under a disadvantage from not having acquired the habit of attention at that period of life when habits are most easily established. A vast effort may be made for a short time. But great things are accomplished more frequently by moderate efforts persevered in, with intervals of relaxation, during a very long period. I have been informed that Cuvier was usually engaged for seven hours daily in his scientific researches; but these were not of a nature to require continuous thought. Sir Walter Scott, if my recollection be accurate, describes himself as having devoted about six hours daily to literary composition, and his mind was then in a state to enjoy some lighter pursuits afterwards. After his misfortunes however he allowed himself no relaxation, and there can be little doubt that this over-exertion contributed, as much as the moral suffering which he endured, to the production of the disease of the brain, which ultimately caused his death. Sir David Wilkie found

that he was exhausted if employed in his peculiar line of art for more than four or five hours daily; and it is probable that it was to relieve himself from the effects of too great labour that he turned to the easier occupation of portrait painting. In fact, even among the higher grades of mind there are but a few that are capable of sustained thought repeated day after day for a much longer period than this. For any one who is engaged in intellectual pursuits there is no more important rule of conduct than that he should endeavour to take a just measure of his own capacity, so that he may not be subject to the ill consequences which arise from the mind being strained beyond its natural powers.

CRITES. I conclude that you use the words *thought* and *thinking* in their more strict sense as implying not simply attention, but also that the mind is actively employed in observing and comparing facts, reasoning on them, and deducing conclusions from them.

EUBULUS. Certainly. I refer to an exercise of the mind beyond that which is required for

learning what has already been proved, and following in the steps of those who have gone before us; and this being the case, the explanation of what I have just mentioned is sufficiently obvious. Mere attention is an act of volition. Thinking implies more than this, and a still greater and more constant exercise of volition. It is with the mind as it is with the body. Where the volition is exercised there is fatigue; there is none otherwise: and in proportion as the volition is more exercised, so is the fatigue greater. The muscle of the heart acts sixty or seventy times in a minute, and the muscles of respiration act eighteen or twenty times in a minute, for seventy or eighty, or in some rare instances even for a hundred, successive years; but there is no feeling of fatigue. The same amount of muscular exertion under the influence of volition induces fatigue in a few hours. I am refreshed by a few hours' sleep. I believe that I seldom, if ever, sleep without dreaming. But in sleep there is a suspension of volition. If there be occasions on which I do not

enjoy the full and complete benefit of sleep, it is when my sleep is imperfect; when my dreams are between waking and sleeping, and a certain amount of volition may be supposed to be mixed up with the phantoms of the imagination.

CRITES. But are you right in limiting the capability of the higher kind of intellectual labour in ordinary cases to so low an average as from four to five hours daily? You referred to the instance of Sir Walter Scott; but, if I remember rightly, Sir Walter has a remark in his diary that, "as to his composition, it was seldom five minutes out of his head during the whole day."

EUBULUS. This remark was made after his misfortunes, and when it is well known that he was exerting himself beyond his powers. But let us refer to the whole passage. He says, "If any one asks me what time I take to think of the composition, I might say, in one point of view, it was seldom five minutes out of my head in the whole day; in another, it was never the subject of serious consideration

at all, for it never occupied my thoughts for five minutes together except when I was dictating."*

This brings us to the consideration of another faculty of the mind, a faculty than which there is none more important: in which I will not say that there is no thinking at all, but certainly nothing like intense thought. The imagination is here more at work than the reasoning powers, and it is to this faculty, which in a greater or less degree every one possesses, the child as well as the man, I might even say the idiot as well as the philosopher, that, being properly employed, we owe the greatest contributions of genius to literature and science. As you have already referred to Sir Walter Scott, I will take him for an example. The fictions of the "Lay of the Last Minstrel," or of "Waverley," cannot be supposed to have been the result of any exercise of volition. They presented themselves to his mind with no more effort than that which precedes the visions of a dream.

* "Diary," February, 1831.

CRITES. Then you consider his novels and poems to have been the result of a sort of waking dream?

EUBULUS. By no means. In sleep there is an absence of volition. If it be not wholly suspended, it is because the sleep is imperfect. The phantoms of the imagination are never stationary. They succeed each other with such rapidity, that they can never be made the subject of contemplation; and very often there is no connection (that is, none that we can trace,) between that which comes first and that which follows. That there really are certain laws which regulate their production, I do not doubt, as there are laws which regulate all the phenomena of the creation; but whatever these laws may be, we know little, and generally nothing, of them. But when awake we have the power of arresting the current of the imagination; we can make the objects which it presents to us the subject of attention; we can view them under different aspects, and thus perceive in them resemblances, relations, and analogies which we could not have perceived

otherwise. Hence new objects are presented to us, not at random, but having a certain connection with those by which they were preceded; and from these we can reject one and select another, and go back to that which we had previously rejected. Our minds are so constructed, that we can keep the attention fixed on a particular object until we have, as it were, looked all around it; and the mind that possesses this faculty in the greatest degree of perfection will take cognisance of relations of which another mind has no perception. It is this, much more than any difference in the abstract power of reasoning, which constitutes the vast difference which exists between the minds of different individuals; which distinguishes the far-sighted statesman from the shallow politician; the sagacious and accomplished general from the mere disciplinarian. Such also is the history, not only of the poetic genius, but also of the genius of discovery in science. "I keep the subject," said Sir Isaac Newton, "constantly before me, and wait until the first dawnings open by little and little into

a full light." It was thus that, after long meditation, he was led to the invention of fluxions, and to the anticipation of the modern discovery of the combustibility of the diamond. It was thus that Harvey discovered the circulation of the blood; and that those views were suggested to Davy, which are propounded in the Bakerian lecture of 1806, and which laid the foundation of that grand serics of experimental researches which terminated in the decomposition of the earths and alkalis.

CRITES. If I understand you rightly, you suppose that the mind, under the circumstances which you mention, is to a great extent in a passive state, objects being presented to it, or conceptions arising in it, which are associated according to certain laws, which differ according to the peculiar structure of individual minds, but which are independent of any direct act of volition; and that the latter is exercised only in keeping the objcct or conception in view while its various relations gradually unfold themselves to our observation. But it seems to me that on some occasions a still more remark-

able process takes place in the mind, which is even more independent of volition than that of which we are speaking; as if there were in the mind a principle of order which operates without our being at the time conscious of it. It has often happened to me to have been occupied by a particular subject of inquiry; to have accumulated a store of facts connected with it; but to have been able to proceed no further. Then, after an interval of time, without any addition to my stock of knowledge, I have found the obscurity and confusion, in which the subject was originally enveloped, to have cleared away; the facts have seemed all to have settled themselves in their right places, and their mutual relations to have become apparent, although I have not been sensible of having made any distinct effort for that purpose.

EUBULUS. What you have now described has occurred repeatedly to myself. It is certainly not very easy to comprehend the nature of this mental operation. Is it that the subject every now and then comes before us, and is considered without our recollecting it after-

wards? — or is it, as a philosophical friend has suggested, that in the first instance we are perplexed by the multiplicity of facts presented to us, and that after an interval of time those of less importance fade away, while the memory retains those which are essential, in the subsequent arrangement or classification of which, being thus rendered more conspicuous, there is no difficulty?

CRITES. The latter seems to be the more probable explanation of the two. At the same time, it must be admitted that they are not incompatible with each other.

Yet we may well doubt whether there be not something more than this. Observe what happens during sleep. However vague and unconnected dreams may be, there is sometimes so much coherence in them, that they are very like realities. You hold a conversation with another person, who, in answer to what you say, uses an argument or makes an observation which you believe to be erroneous, and contradict. This is only one of many examples of the same kind which dreams afford.

Eubulus. With reference to such dreams, Dr. Johnson has somewhere observed that the dreamer must have invented the argument used against himself without being aware that he had done so. This, however, is merely a statement of the fact, and no explanation of it. A late writer, whose mind had in it more of ingenuity than of philosophy, published a thick volume, to prove that each hemisphere of the cerebrum has a separate mind, and that on these occasions the two hemispheres might be considered as conversing with each other.* The work to which I allude, however fantastic it may be, contains many curious illustrations of mental phenomena. But I do not believe the hypothesis, or rather, I should say, that it is not in my nature to believe it. It seems to me that the question as to the oneness and individuality of the mind is very clearly and unanswerably stated by Father Buffier.† It is one of those fundamental truths which are in-

* On the Duality of the Mind, by A. L. Wigan, M.D., 1844.

† Traité des Premières Vérités. Deuxième partie, ch. 10.

herent in us, and defy all argument; which I can no more help believing than I can help believing in the external world, or even in my own existence.

CRITES. The subject of dreams is one of great interest, and I shall be glad if we can have the opportunity of discussing it hereafter. At present I would rather revert to a former part of our conversation.

Admitting all that you say as to the advantage of contemplative habits, still you surely do not mean to assert that these are more important than the capability of forming a right judgment of the thing before us, and of reasoning accurately.

EUBULUS. Certainly not. But neither do I doubt that in all cases in which we have to arrive at a conclusion by comparing the evidence on one side with that on the other (and these include all branches of human knowledge except pure mathematics), nothing contributes so much to accurate reasoning as the habits of which we are speaking. The principal defect in those who reason inaccurately is that so

happily illustrated by the fable of the two knights disputing about the gold and silver shield. They do not see, or they do not take into the account, the whole of the facts on which their conclusion is to be founded. Who is so little liable to fall into this error as the individual who keeps the subject to which his inquiries are directed constantly before him, until all its relations gradually are presented to his view? Observe, that I am speaking of a well-regulated imagination, which is not led astray by prejudice or passion, or fanciful analogies. The ill-regulated imagination of inferior minds is quite a different matter, and produces nothing but enthusiasts, fanatics, and, I may add, impostors.

CRITES. But, unfortunately, it is these last classes of persons who, by means of their activity and earnestness, are often the most influential in the world. A fanatical monk persuaded the whole of Christendom to embark in the wild scheme of the Crusades. Lord George Gordon, a crazy fanatic, led the London mob to burn down Newgate, and nearly to in-

volve the whole of the metropolis in the conflagration. It is not long since no small number of persons, and not merely those belonging to the uneducated classes, were led to believe that a dropsical old woman was about to be the mother of the real Shiloh: and, even at the present day, many thousand Mormonites attest their belief in the divine mission of a half-madman and half-impostor in the person of Joe Smith. How many similar histories may be furnished by any one who studies the past history of the human race!

EUBULUS. I am afraid that we need not go so far back as the age of the Crusades, nor refer to the disciples of Joanna Southcote, or the Mormonites, for instances of such credulity on the part of a considerable portion of mankind. We have, indeed, discarded our faith in astrology and witches: we pity the ignorance of the poor African, who, in a season of drought, seeks the conjurations of the rainmaker; we cannot well comprehend how it was that the civilised Athenians of the third century should have believed that marble statues would feel

themselves to be offended, and show their displeasure by leaving their pedestals and walking about at night.* Nevertheless, with all our boasted wisdom, and all our advance in knowledge, there are at the present day many who believe in things not supported by better evidence than these. There are epidemics of opinion as well as of disease, and they prevail at least as much among the well-educated as among the uneducated classes of society. The energy and sincerity of enthusiasts is powerful in all ages, and carries with it the conviction of that large portion of mankind who do not inquire and think for themselves. It is, indeed, a melancholy fact, that a great extension of education and knowledge does not produce any corresponding improvement in this respect. Still, in the end, good sense prevails. Errors and deceptions last only for a time. Those which disgrace one age vanish, and are succeeded by those which disgrace the next. But a truth once established remains undisputed, and society, on the whole, advances.

* Lucian in Philopseudes.

CRITES. But does not what you have now stated tend to show that there is some defect in modern education? Might it not do more than it does towards the improvement of the reasoning faculty?

EUBULUS. I doubt it. Education does a great deal. It imparts knowledge, and gives the individual worthy objects of contemplation for the remainder of his life. It strengthens his power of attention; and such is especially the case with the study of mathematics; and in doing so it cannot fail, to a certain extent, to assist the judgment. Still it seems to me, that to reason well is the result of an instinct originally implanted in us, rather than of instruction; and that a child or a peasant reasons quite as accurately on the thing before him and within the sphere of his knowledge, as those who have gone deep into the study of logic as a science. With regard even to mathematics, I much doubt whether they tend to improve the judgment on those subjects to which they are not immediately applicable. Dugald Stewart makes the following obser-

vation : — "In the course of my own experience I have never met with a *mere* mathematician who was not credulous to a fault, not only with respect to human testimony, but credulous also in matters of opinion, and prone on all subjects, which he had not carefully studied, to repose too much faith in illustrious and consecrated names."* Nor is this at all difficult to explain. The principal errors of reasoning on all subjects beyond the pale of the exact sciences arise from our looking only on one side, or too exclusively on one side, of the question. But in mathematics there is no alternative. It has nothing to do with degrees of probability. The truth can be on one side only, and we arrive at a conclusion about which there is no possibility of doubt, or at none at all. In making these observations, however, do not suppose that I do not sufficiently estimate this most marvellous science, which, from the simplest data, has been made to grow up into what it now is by the mere force of the human intellect ; the truths of which

* Moral Philosophy, 4th edition, 1827, vol. iii. p. 280.

would have been the same if heaven and earth had never existed; would be the same still if they were now to pass away; and by means of which those branches of knowledge to which it is applicable have been brought to a state of perfection which others can never be expected to attain.

ERGATES. It certainly seems to me, as it does to Eubulus, that the faculty of reasoning correctly (or what is commonly called having a clear head) is for the most part a natural gift, and that it admits of being artificially improved only in a limited degree. Indeed, it admits of a question, whether modern education, instead of doing too little, does not, on the whole, err on the side of attempting to do too much? Sir Humphry Davy, when a boy, was placed under a schoolmaster who neglected his duties, and adverting to this subject in a letter addressed to his mother after he was settled in London, he says, "I consider it as fortunate that I was left much to myself as a child, and put on no particular plan of study, and that I enjoyed much idleness at Mr. Coryton's school.

I, perhaps, owe to these circumstances the little talents I have, and their peculiar application. What I am I made myself. I say this without vanity, and in pure simplicity of heart."* John Hunter, who, in the department of science, is one of the most remarkable individuals whom this country has produced, had applied very little to study of any kind until he came to London, and began that of anatomy, under his brother William. Like Davy, he was distinguished for his perseverance, the originality and comprehensiveness of his views, and the clearness of his intellect. Would not these faculties have been cramped and deranged, rather than improved, by a more systematic education?

EUBULUS. In accordance with your view of the matter, Sir Walter Scott has somewhere observed, that "the best part of every man's education is that which he gives himself;" and I willingly admit that, among those whose intellect is of the higher order, there are many who would ultimately accomplish greater things

* Memoir, by John Davy, M.D., vol. i., chap. 1.

if in early life they were left more to their own meditations and inventions than is the case among the more highly educated classes of the community.* Ferguson, the astronomer and mechanical philosopher, told Dugald Stewart that "he had more than once attempted to study the 'Elements of Euclid,' but found himself quite incapable of entering into that species of reasoning. He satisfied himself of the truth of the various geometrical propositions of which he had daily occasion to make use, by means of compasses and other mechanical contrivances." † It is well known that Ferguson had little or no education. If it had been otherwise, it is more than merely probable that he would have been held to be a dunce, and that the peculiar talent by which he acquired his reputation would have been crushed or wasted. A high education is a leveller, which, while it tends to improve ordinary minds, and to turn idleness into industry, may, in some instances, have the effect of preventing the full expansion of genius. The

* See Additional note A.

† Stewart's Moral Philosophy, 1814, vol. ii. p. 196.

great amount of acquirement rendered necessary by the higher class of examinations as they are now conducted, not only in the universities, but in some other institutions, while it strengthens the power of learning, is by no means favourable to the higher faculty of reflection. But it must be borne in mind, that in this world none of our schemes are perfect, and that in all human affairs we must be content to do that which is best on the whole. Geniuses are rare exceptions to the general rule; and a mode of education, which might be well adapted to the few who think for themselves, would be ruinous to the unreflecting majority. As to making one system of education for one class of minds, and another for another, there are, if I may be allowed to use a metaphorical expression, mechanical difficulties in the way. Besides, who is to know what a boy's mind is, or what is his peculiar turn, until the greater part of his education is completed?

CRITES. I agree with you to a great extent, but not altogether.

"Est quâdam prodire tenus si non datur ultra."

I apprehend that the changes as to education, which are now in progress in this country, of which the principal result will be the introduction of new branches of study into our schools and colleges, will do much towards remedying the defects of the present system. Those who have it not in their power to excel in one thing will find that they may, nevertheless, excel in another; and each individual will naturally, and almost unconsciously, direct his attention to those subjects which are most congenial to his taste, and best adapted to the peculiar structure of his mind.

THE SECOND DIALOGUE.

Mind and Matter. — Natural Theology. — Views of Sir Isaac Newton. — Reasons for regarding the Mental Principle as distinct from Organization. — The Influence of the one on the other not sufficiently regarded by Metaphysicians. — Relations of the Nervous System to the Mental Faculties. — Speculations of Hooke, Hartley, &c. — The Brain not a single Organ, but a Congeries of Organs cooperating to one Purpose. — Physiological Researches of Magendie and Flourens. — The different Capacities of Individuals for the Perception of Colours, Musical Sounds, &c., probably dependent on different Organization of the Brain. — Supposed Connection of the Cerebellum with Locomotion. — Is there an Organ of Speech? — Instances of Want of Speech in those who were neither Deaf nor Idiotic. — Stammering. — Memory. — Dr. Hooke's Speculations. — Affections of the Memory from Cerebral Disease or Injury. — Impressions on the Brain not sufficient for Memory, unless accompanied by Attention, which is an Act of the Mind itself. — The Nature of the Physical Changes which occur in connection with the Memory beyond the reach of our Observation and Capacities.

It was on the day following that of the foregoing discussion that our friend invited us to accompany him to a spot in the neighbourhood

which, from its greater elevation, afforded an extensive panoramic view of the whole of the surrounding country. Our road was by an easy ascent; the weather was fine; and, as we proceeded leisurely, we were able to combine the pleasures of conversation with those of breathing the fresh air and admiring the beauties of the scenery. When we had reached the summit of the hill, we were amply rewarded for the trouble of ascending it. It was one of those days which so frequently precede a fall of rain, when the transparency of the atmosphere renders distant objects unusually distinct, and apparently less distant than they really are. For twenty-five or thirty miles, on every side, the country lay before us, with its woods and meadows, villages and churches, as plain as if they had been represented on a map. The sun was at this time about two hours above the horizon, his beams being occasionally intercepted by some light clouds, the shadows of which sometimes fell on ourselves, and at other times were seen rapidly traversing the landscape below. A slender moon, not

more than three days old, was seen following the sun towards the west.

"I never," said Eubulus, "find myself left to my own contemplations in a situation such as this without a feeling of wonder at myself and my own existence. Here am I, I mean I, who feel and think, pent up within the narrow dwelling of my own body, yet taking cognisance of things remote in space, not only of those which belong to our own world, but of those in the vast universe around us. Marvellous as this may be, let us wait but for a few hours, and we have what is still more marvellous. By the aid of a tube and a few glasses, I may become acquainted with other objects, suns and worlds, distant from us not only in space, but also in time, which I see not as they now are, but as they were many thousands of years before I myself was in existence. I do not say that such reflections prove more than may be proved in other ways, but they certainly impress my mind more strongly with the conviction that, as a percipient, conscious, and intelligent being, I belong to a mode of existence

wholly different from that of the senseless bodies by which I am surrounded, and that (even independently of the evidence afforded by revelation) there is nothing unreasonable in the universal expectation of mankind (so universal, indeed, that it may well be regarded as an instinct) that there is something in us which will remain, and be capable of perception and thought, and it may be of pure and high aspirations, when the gross material fabric with which it is now associated has become resolved into its original elements."

CRITES. I can perfectly enter into the sentiments which you have now expressed. The properties of mind are so wholly different from those of matter, the two are so completely asunder, that they do not admit even of the most distant comparison with each other. I can easily imagine that motion, gravitation, heat, light, electricity, magnetism, chemical attraction, have something in common; that they are (as, indeed, Mr. Grove has shown them to be) so far of the same essence as to be convertible into each other; but it is to me

wholly inconceivable that any exaltation of the known properties of matter should produce the conscious indivisible monad which I feel myself to be. When the materialist argues that we know nothing of mind except as being dependent on material organization, I turn his argument against himself, and say that the existence of my own mind is the only thing of which I have any positive and actual knowledge. I cannot help believing in the existence of an external world. Still the hypothesis of its non-existence implies no contradiction; whereas it is as much a contradiction to doubt the existence of my own mind as it would be to doubt that two and two are equal to four. You must excuse me, however, if I say that it occurred to me yesterday (though I did not notice it at the time) that in one of your remarks, you seemed to identify the functions of the mind with those of the body more than you are disposed to identify them at present. I allude to the comparison which you made of the effect produced by long-continued voluntary effort in the maintenance of muscular

contraction, and in the operations of the intellect.

EUBULUS. When we say that we believe in the independent existence of the percipient and thinking principle, I apprehend that neither you nor I can mean to deny the obvious fact of it having a connection with our bodily organs, by means of which it receives impressions from without, and operates in return on bodies external to itself.* This, however, is not peculiar to such humble beings as ourselves. When I contemplate the evidence of intention and design which present themselves everywhere around us, but which, to our limited comprehensions, is more especially manifested in the vegetable and animal creations, I cannot avoid attributing the construction and order of the universe to an intelligent being, whose power and knowledge are such that it is impossible for me to form any adequate conception of them, any more than I can avoid referring the motions of the planets and stars to the same law of gravitation as that which directs the motions

* See Additional Note B.

of our own globe. But no one, I apprehend, will maintain that the mind of the Deity depends on a certain construction of brain and nerves; and Dr. Priestley *, the most philosophical of the advocates of the system of materialism, ventures no further than to say that we have no knowledge on the subject. But, to use the words of Sir Isaac Newton, "This powerful ever-living agent being in all places, is more able to move the bodies within his boundless uniform sensorium, and thereby to form and reform the parts of the universe, than we are, by our will, to move the parts of our own bodies." The remainder of the passage from which I have made this quotation, is not without interest, as indicating the view which Newton took of the matter in question:— "And yet we are not to consider the world as the body of God, or the several parts thereof as the parts of God. He is an uniform being, void of organs, members, or parts, and they are his creatures, subordinate to him and subser-

* Priestley, Disquisitions on Matter and Spirit, sect. 9.

vient to him, and he is no more the soul of them than the soul of man is the soul of the species carried through the organs of sense into the place of its sensation, where it perceives them by its immediate presence, without the intervention of any third thing. The organs of sense are not for enabling the soul to perceive the species of things in its sensorium, but only for conveying them thither; and God has no need of any such organs, he being everywhere present to the things themselves." *

ERGATES. I entirely agree with you in the opinion that we must admit the existence of the Deity as a fact as well established as that of the law of gravitation, and that in doing so we must further admit that mind may and does exist, independently of bodily organization. Be it also remembered that *mind*, in its humblest form, is still *mind*, and that, immeasurable as the distance between them may be, it must nevertheless be regarded as being of the same essence with that of the Deity himself. For my own part I find no difficulty in

* Optics, book iii. p. 379., 4th edition.

eoneeiving the existenee of mind independently of eorporeal organs. But our actual experienee of the human mind is only as we find it in this eombination, and in no other way ean it be the proper objeet of study. It seems to me that the best writers on mental philosophy have erred in considering the mind too abstraetedly, and in not taking suffieiently into the aeeount the physieal influenees to which it is subjeeted.

EUBULUS. There are, however, those who form an exception to this rule; for example. Deseartes, Hartley, and that universal genius Dr. Hooke. Moreover, Dr. Reid's inquiry into the human mind is founded on a eritieal examination of the several senses; and Dr. Berkley's essay on the corporeal function of vision contains the germ of all his metaphysieal investigations.

CRITES. You might have ineluded the mystical speeulations of Unzer and some other German writers. Reid and Berkley were eertainly as far as possible from being materialists. The others, without one exception, have been

guilty of an error the very opposite to that which I have mentioned, giving as an explanation of mental phenomena that which not only has no foundation in observation and experience, but which is, indeed, no explanation at all. When I learn from Hartley that thought is a vibration of the fibres of the brain; and from Hooke that there is a matter in the brain intended to receive the impressions of sound, which may be compared to the bells and vases which Vitruvius describes as being placed in the ancient theatres*; and that thinking is the radiation of the soul from one part of the brain to another, I do not find myself to be a whit wiser than I was before.

Eubulus. That may be true. But when Hooke states that there are various structures in the brain adapting it for the part which it has to perform in connection with the mental principle, — that there is an organ of memory, for example, — I find so many facts which are favourable to this opinion, that I cannot but regard it as more than a mere hypothesis. As

* Posthumous Works. — Lectures on Light, sect. 7.

to this point, however, Ergates has had greater opportunities than I have had of obtaining information; and I should be well pleased to hear what he has to say on the subject.

ERGATES. If I comply with your wishes, I must make some small demand on your patience, as, although what I have to say may not be much in substance, it cannot be compressed into a very few words.

We may safely assume, as an established fact, that it is only through the instrumentality of the central parts of the nervous system that the mind maintains its communication with the external world. The eye is necessary to sight, and the ear to hearing; and so with the other organs of sense. But the eye does not see, and the ear does not hear; and if the nerve which forms the communication between any one organ of sense and the brain be divided, the corresponding sense is destroyed. In like manner it is from the brain that all those impulses proceed by which the mind influences the phenomena of the external world. The division of the nerves which extend from the

brain to the larynx destroys the voice. The division of the nerves of a limb causes the muscles of the limb to be paralysed, or, in other words, withdraws them from the influence of the will; and the division of the spinal chord destroys at once the sensibility and the power of voluntary motion in all the parts below that at which the division has been made.

If we investigate the condition of the various orders of vertebrate animals, which alone admit of a comparison with our own species, we find, on the one hand, great differences among them with regard to both their physical and mental faculties; and on the other hand a not less marked difference as to the structure of their brain. In all of them the brain has a central organ, which is a continuation of the spinal chord, and to which anatomists have given the name of *medulla oblongata.* In connection with this there are other bodies placed in pairs, of a small size and simple structure in the lowest species of fish, becoming gradually larger and more complex as we trace them through the other classes, until they reach their greatest

degree of development in man himself. That each of these bodies has its peculiar functions there cannot, I apprehend, be the smallest doubt; and it is, indeed, sufficiently probable that each of them is not a single organ, but a congeries of organs, having distinct and separate uses. Experimental physiology, joined with the observation of the changes produced by disease, has thrown some light on this mysterious subject. There is reason to believe that, whatever it may do besides, one office of the *cerebellum* is to combine the action of the voluntary muscles for the purpose of locomotion. The *corpora quadrigemina* are four tubercles, which connect the *cerebrum*, *cerebellum*, and *medulla oblongata* to each other. If one of the uppermost of these bodies be removed, blindness of the eye of the opposite side is the consequence. If the upper part of the *cerebrum* be removed, the animal becomes blind, and apparently stupified, but not so much so but that he may be roused, and that he can then walk with steadiness and precision. The most important part of the whole brain seems to be

one particular part of the central organ, or *medulla oblongata.* While this remains entire, the animal retains its sensibility, breathes, and performs instinctive motions. But if this very minute portion of the nervous system be injured, there is an end of these several functions, and death immediately ensues. These facts, and some others of the same kind, for a knowledge of which we are indebted to modern physiologists, and more especially to M. Magendie and M. Flourens, are satisfactory as far as they go, and warrant the conclusion that there are various other organs in the brain, designed for other purposes, and that if we cannot point out their locality, it is not because such organs do not exist, but because our means of research into so intricate a matter are very limited.

CRITES. Granting your proposition, and not denying that there may be original differences in the mental principle itself, we perceive to how great an extent the propensities and characters of individuals may depend on their physical organization. One person, for

instance, may have a nicer perception of colours than another in consequence of the organ by which colours are distinguished being in the one more, and in the other less, developed.

ERGATES. Or the organ may be so imperfect that the perception of colours may be in a great degree, and as to some colours entirely, wanting. In fact, examples of this imperfection are not very uncommon. There are some persons who are incapable of recognising the difference of colours which appear quite different to ordinary observers, and who are especially liable to confound the two complementary colours of red and green with each other, so that where a scarlet cloth is laid out on the green turf they perceive no difference between them. The great difference which exists in different individuals as to the perception of musical sounds, or the power of numerical calculation, is best explained by attributing it to a difference of organization; and it is probable that the imperfection or absence of other faculties which we occasionally meet with is to be explained in the same manner. For ex-

ample, if there be a part of the brain whose office it is to combine the action of muscles for the purpose of locomotion, it is a fair conclusion that there is some other part of it answering the same purpose as to the muscles of speech; an organ which, if not peculiar to them, is most complete and perfect in the human race, the "μεροπες ανθρωποι."

CRITES. If so, an imperfection or absence of this organ should be a cause of dumbness. But I have understood that dumb persons are either those who are congenitally deaf, so that they cannot hear the sounds which they are required to imitate, or those who are idiotic, and deficient in other faculties as well as in this.

ERGATES. What you have stated is undoubtedly the general rule. There are, however, cases of incapability of articulate speech which cannot be referred to either of these categories. There are individuals who, having suffered from disease of the brain, are unable to express their thoughts by speech, although, their faculties being little or not at all impaired otherwise, they have a perfect comprehension of what others

say, and of what they wish to say themselves. Some of them can utter a few words, others none at all, and others again, when intending to say one word, use another. There are other cases still more remarkable, the facts of which may well lead us to believe that the organ of speech, if not originally and congenitally wanting, has been at any rate from the beginning so imperfect as to be useless. Two examples of what I have now mentioned have come under my own observation. Several years ago, I saw a little boy, then about five years old, whose faculty of speech was limited to the use of the word *papa*. This, it may be observed, is so simple a sound, that dolls are made, by some very simple mechanism, to produce it very distinctly. I soon ascertained that his sense of hearing was perfect, and that there was nothing peculiar in the formation of the soft palate, mouth, and lips. There was no want of inclination to speak, but in the attempt to do so he produced sounds which were wholly inarticulate. So far was he from being deficient as to his powers of apprehension,

that he seemed to be even beyond what children of the same age generally are in this respect. Although he could not speak himself, he understood perfectly what was said to him by others, and expressed his answers by signs and gestures, spelling with counters monosyllabic words which he was incapable of uttering. I should add, that the external senses and powers of locomotion were perfect, and that all the animal functions were properly performed. The only other sign of disease or imperfection of the nervous system was that, for two or three years before I saw him, the boy had been subject to fits or nervous attacks, attended with convulsions, but which (as I was informed) his medical attendant in the country regarded as having the character of hysteria rather than that of epilepsy.

I have had no other opportunity of making my own observations on the case; but eight years afterwards I was informed, on good authority, that the boy was still unable to speak, though he had made much progress otherwise; and that, among other acquisitions, he

wrote beautifully, and was very clever in arithmetic.

The other case to which I have referred was that of a girl, who, at the time of my seeing her, was eleven years of age. She had no faculty of speech, uttering merely a few inarticulate sounds, which her parents in some degree understood, but which were wholly unintelligible to others. It was easily ascertained that her sense of hearing was perfect, and that there was no defect in the formation of the external organs. After a careful examination, I was satisfied that the parents were correct in saying that she comprehended all that was said to her. She was perfectly tractable and obedient, and did not differ either in her appearance, or as to her general behaviour, from other intelligent children. Being in an humble sphere of life, it seemed that very little trouble had been taken with her education; still, when I placed before her a book which she had never seen before, and desired her to point out different letters, she did so with readiness and accuracy, making no mistakes. She had never suffered from fits

of any kind, nor were there any indications of cerebral disease or other physical imperfection. Her parents said that from her earliest age she had been as she was when I saw her, equally intelligent, but incapable of speech.

EUBULUS. The facts which you mention are very interesting; and it seems to me that they throw light on at least some cases of stammering, in which we may suppose that the organ of speech is more or less imperfect, although it may be not altogether wanting. But let us go back to Dr. Hooke: he says,—"I suppose memory to be as much an organ as the eye, ear, or nose, and to have its situation (in the brain) somewhere near the place where the nerves from the other senses concur and meet." He then goes on to explain in detail, that the soul, or first principle of life, though it be an incorporeal being, yet in performing its actions, makes use of corporeal organs; that in the brain there is a repository of impressions made by the senses for the purpose of memory; but that no idea can be stored up in this repository without the directing

power of the soul, and that this act of the soul is what is called attention.

ERGATES. I am not prepared to admit, nor is it worth while to discuss, the explanation which Hooke has given of what goes on in the brain in connection with the memory, and other mental processes, it being for the most part fantastical, and unworthy of so great a philosopher; but that he and others are correct in regarding memory as being in some way connected with our physical organization, there can be, I conceive, not the smallest doubt.

The eye, the ear, and the other organs of sense, are physical instruments by means of which impressions are communicated through the nerves to the brain. Without this apparatus, in our present state of existence, there would be no sensations; no knowledge of any thing external to ourselves. It does not, however, follow that the brain itself feels, or that it performs any other than a subordinate office, conveying the impressions received from the organs of sense to a superior principle in connection with it. Memory is a recurrence of

sensations, which existed formerly, produced by the operation of some internal changes, after the causes, by which the first sensations were excited, have ceased to exist. These renewed sensations are (with some rare exceptions) fainter and less distinct than those in which they originated. There is also this difference between them, that the renewed sensations are subject to the influence of volition, vanishing at once on the slightest effort being made to direct the attention to anything else; whereas we have no such power over the impressions which are made on our senses by the immediate presence of external objects. Notwithstanding these points of difference, it is plain that memory is closely allied to sensation, and the resemblance between the two orders of phenomena is so great as to justify the suspicion that the nervous system is instrumental in producing the one as well as the other; while a multitude of facts show that the suspicion is well founded. A blow on the head may destroy the memory altogether, or (which is more usual) it may destroy it partially, or it may interrupt its exercise for

a certain time, after which it may be gradually, or even suddenly, restored. After fever, also, and some other bodily ailments, the memory is not unfrequently impaired or lost. A gentleman found that he had lost the power of vision in one eye. Then he regained it partially in that eye, but lost it in the other. Afterwards he partially regained it in the eye last affected. He could now see objects when placed in certain positions, so that the image might fall on particular parts of the retina, while he was still unable to see them in other positions. These facts sufficiently proved the existence of some actual disease. But observe what happened besides. His memory was affected as well as his sense of sight. Although in looking at a book he recognised the letters of the alphabet, he forgot what they spelled, and was under the necessity of learning again to read. Nevertheless, he knew his family and friends; and his judgment, when the facts were clear in his mind, was perfect.

In another case, a gentleman who had two years previously suffered from a stroke of apo-

plexy (but recovered from it afterwards) was suddenly deprived of sensation on one side of his body. At the same time he lost the power, not only of expressing himself in intelligible language, but also that of comprehending what was said to him by others. He spoke what might be called *gibberish*, and it seemed to him that his friends spoke *gibberish* in return. But while his memory as to oral language was thus affected, as to written language it was not affected at all. If a letter was read to him, it conveyed no ideas to his mind; but when he had it in his own hand, and read it himself, he understood it perfectly. After some time he recovered of this attack, as he had done of that of apoplexy formerly. He had another similar attack afterwards.

A blow on the head which causes insensibility generally affects the memory so far that when the patient has recovered from the state of insensibility he has no knowledge of the accident. But in some instances the effect of a blow on the head is merely to disturb the memory, the other functions being unimpaired. A groom

in the service of the Prince Regent was cleaning one of some horses sent as a present to His Royal Highness by the Shah of Persia. It was a vicious animal, and he kicked the groom on the head. The groom did not fall, nor was he at all stunned or insensible; but he entirely forgot what he had been doing at the moment when the blow was inflicted. There was an interval of time, as it were, blotted out of his recollection. Not being able to account for it, he supposed that he had been asleep, and said so to his fellow servant, observing at the same time "that he must set to work to clean the horse, which he had neglected to clean in consequence of his having fallen asleep."

In other cases the effect of a blow on the head has been not only to erase from the memory the events which immediately preceded the accident, but also to prevent it retaining the impression of those which occurred immediately afterwards. A young man was thrown from his horse in hunting. He was stunned, but only for a few minutes; then recovered, and rode home in company with his friends,

twelve or thirteen miles, talking with them as usual. On the following day he had forgotten not only the accident itself, but all that happened during his journey home.

It would be easy to multiply examples such as these, both from my own experience, and from the observations of others: and from them it seems to be a legitimate conclusion, that the nervous system is instrumental in producing the phenomena of memory as well as those of sensation. They show also that it is not in every part of the nervous system, but in the brain, that memory resides. This faculty is injured by a blow on the head, or a disease affecting the brain; but not by an injury of the spine, or a disease of the spinal chord. The eyes may be amaurotic; but Milton and Huber retained the memory of objects which they had seen previously to their blindness. It is not the spinal chord, nor the nerves, nor the eye, nor the ear, but the brain, which is the store-house of past sensations, by referring to which the mind is enabled to renew its acquaintance with events which are passed, and at the same

time to obtain the means of antieipating, to a great extent, the events whieh are to come.

Crites. Your view of the matter then seems to be that impressions made on the organs of sense, and transmitted to the brain, produee some aetual change in the minute organization of the latter, and that this is subservient, and in our present state of existence, essential to the memory.

Ergates. I do not see how the faets whieh I have mentioned, and a hundred others whieh I might mention, ean be otherwise explained. What the actual ehanges in the eondition of the brain may be, it is impossible for us to eomprehend. Yet it is in no degree remarkable that sueh ehanges should take plaee. We see a tree whieh has been exposed for eenturies to the heat of summer, and the cold of winter, and the influence of the winds and tempests. Every change of temperature, every gust of wind, every storm of rain or hail, and probably even every ehange in the eleetric condition of the atmosphere, must have left its mark behind by producing some slight alteration in its root,

and trunk, and branches. We recognise only the general result, when we see the aged tree, with its fissured bark, and its branches inclined to that side from which it has been the least assailed by the wind. But a being of superior knowledge, and possessed of the faculties necessary for more minute and accurate observation, would be able to distinguish the effect of every individual impression made by the operation of the causes which have been enumerated, and of others more obscure.

In offering these remarks, however, let me not be misapprehended as giving our knowledge for more than it is actually worth, or as pretending to understand more than we understand in reality. In our present state of existence, as the eye, the ear, the touch, and the other organs of sense, and, I may add, the action of our muscles, are the means by which we obtain a knowledge of things external to ourselves; so it would appear that the organization of the brain is made subservient to the function of memory. As to what there may be besides, or what may be the capabilities of

the mental principle, independently of organization; or how much may belong to the one, and how much to the other, I do not pretend to offer an opinion. Here, as in other matters belonging to this order of inquiries, we may be sure that our actual knowledge goes very little way. "We see these things through a glass darkly," and must be content humbly to acknowledge that the greater part is not only beyond the limits of our observation, but probably beyond those of our comprehension.

There is, however, one other point which is not beyond the reach of our capacities, and which ought not to be left unnoticed. It is clearly not sufficient that an impression should be transmitted to the brain for it to be remembered. An act of the mind itself is necessary for that purpose; and that, as Dr. Hooke has observed, is the act of attention. It is only a small proportion of what we see, or hear, or feel, or imagine, that is not immediately forgotten, simply because there are very few of these things to which we pay more than a momentary attention, while to many of them we

pay no attention at all. Now, as Eubulus explained to us on a former occasion, attention implies volition; that is, it is that effort of volition by which an object, which would otherwise have immediately passed away, is kept present to the mind during a certain period of time. Sensation and volition are the two functions by means of which the mental principle is enabled to maintain its communication with the external world. It is under the influence of volition that the contraction of muscles takes place for locomotion, speech, the procuring of food, and other purposes, and that the torpedo discharges his electric battery. Here there is an impulse communicated from the mind to the brain, from thence to the nerves, and from these to other organs, and producing a marked change in the condition of the latter; and, *à priori*, there is no reason to doubt that the operation of a similar cause may produce an equal change, though of another kind, and more permanent, in the minute structure of the brain itself.

CRITES. If these views be correct, and if

your speculation also be correct as to the existence of special organs in the brain for the purposes of locomotion and speech, it would appear probable that there is a special organ for that of memory also.

ERGATES. That is true. But there our knowledge ends. We may, I suppose, take it for granted that there is no animal whose memory is equally capacious with that of man; and we know that, with the exception perhaps of the dolphin (of whose faculties we know nothing), there is no other animal in whom that portion of the cerebrum which we call its hemispheres, and which are bounded externally by the convolutions, is equally developed. It may be said, and not without some show of reason, — "Do not these facts seem to indicate where the faculty of memory resides?" Willis answered the question in the affirmative.* But observe how it is in birds. In them there are

* "Multiplices cerebri plicæ et convolutiones requiruntur, nempe ut in istis, tanquam in diversis cellulis et apothecis, sensibilium species reservari, atque illinc pro datâ occasione evocari queant." — *Willis de Anatome Cerebri*, cap. 10.

no convolutions; and the only part of the brain which can be said to correspond to the cerebral hemispheres of man, is merely a thin layer of cerebral substance expanded over some other structures which are developed to an enormous size. Yet we know that birds which are domesticated exhibit signs of considerable memory, parrots and cockatoos recognising individuals after a long interval of time; and that birds in their natural state return to their old haunts after their annual migrations. The exploits of the carrier-pigeons cannot be explained without attributing to them no small powers of observation, and of recollecting what they had observed. Perhaps future observations on the effects produced by disease of the brain in connection with affections of the memory may throw some light on this mysterious subject. At present we must be content to acknowledge that we know nothing as to the locality of the function, nor of the minute changes of organization which are connected with it.

THE THIRD DIALOGUE.

The Subject of Memory continued. — Sequence and Association of Ideas.—Suggestion of Ideas by internal Causes acting on the Brain by the Nerves, or through the Medium of the Blood. — Influence of Narcotics, Morbid Poisons, Lithic Acid, Impure Atmosphere, and other Physical Agents on the Condition of the Mind. — Such Inquiries not only of scientific Interest, but also of practical Importance. — Physical Causes of Mental Illusions. — Examples of false Perceptions referred to the Sight and other Senses. — Other forms of Illusion more frequent in Cases of Mental Aberration than mere Deceptions of the External Senses. — Mr. Locke's Definition of Insanity not sufficiently comprehensive. — A too rapid Succession of Ideas, with Incapability of fixing the Attention, incompatible with correct Reasoning. — State of Mind in the so-called "Moral Insanity." — Question as to the Limits of Moral Responsibility.

THE conclusion of our journey had somewhat abruptly terminated our conversation. When we were assembled in the evening, the subject of it was thus resumed by Eubulus.

EUBULUS. Although some of the opinions which Ergates expressed this afternoon may be regarded as hypothetical, and not admitting of

actual and positive proof, yet it must be owned that they are supported by many facts, and by some in addition to those which he has himself adduced. Especially his views as to the nature of memory seem to afford an explanation of some circumstances, relating to the connection of the mind with the body, which cannot well be explained otherwise.

For instance: we remember nothing of what occurred in infancy. That part of our life seems afterwards to be a blank in our existence; and it is not unreasonable to suppose that the brain, like some other of the organs of the newly born child, is in an unfinished state, and, therefore, not fitted to retain the impressions made on it during any considerable period of time.

Then the impressions made on the memory gradually become fainter and fainter as time elapses; and this is in accordance with the gradual alteration which our physical structure undergoes as we advance in life. If there be exceptions to the rule, they are such as tend to prove the rule itself. For example, where the

recollection of an event which occurred long ago is unusually vivid, we say, "it seems as if it had happened only yesterday," and, on the other hand, when the recollection of an event which occurred only lately is unusually faint, it appears to us at first that it happened long ago; and it is only after some consideration, and by referring to some other circumstances in connection with it, that we are enabled to correct the error.

ERGATES. Allow me to interrupt you for a moment by observing that, besides those which I have already mentioned (namely, diseases and injuries of the brain), there are other physical agents which prevent things, of which we are conscious at the time, from being permanently impressed on the memory. Thus, a drunkard either forgets altogether, or has only a vague recollection of the nonsense which he talked, and the follies of which he was guilty, on the previous day while under the influence of alcohol; and those who, for the purpose of undergoing a surgical operation, are placed under the influence of what are called

anæsthetic agents, as ether or chloroform, although in most instances they appear to pass into a state of entire insensibility, in other instances groan and struggle, and give evident signs of suffering while the operation lasts, although they remember nothing of it afterwards, and can scarcely be persuaded that what they had so much dreaded is really completed.

EUBULUS. I cannot complain of the interruption, as the facts which you mention are very much to the purpose. But I was going on to observe, in connection with our present inquiry, that, without denying the generally received doctrines as to what metaphysicians have called the association or suggestion of ideas, still these do not explain the whole. How often does it happen that thoughts arise, and images present themselves to the mind, which cannot be traced as the immediate result of impressions on the external senses, or of anything that was passing in the mind previously. But may not this be explained by supposing that the brain, as the organ of memory, and therefore of the imagination, is liable to be

influenced by a variety of physical impressions communicated from other parts of the corporeal system besides the immediate organs of sense, through the medium of the nerves. Whoever will carefully inquire into what passes within himself, will, I suspect, be satisfied that there are many of his thoughts, and trains of thought, and, I may add, of the agreeable or disagreeable feelings with which they are associated, that cannot be accounted for otherwise.

ERGATES. Dreams present some striking examples of what you have now mentioned. You are awaked by a distressing dream, and find yourself labouring under the uncomfortable sensations occasioned by acid in your stomach. You take some magnesia, which will neutralise, or drink a glass of cold water, which will dilute, the acid, lie down again, and enjoy a refreshing sleep. A lady had a small tumour in one leg. It was hard, well defined, exquisitely tender, so that even a slight pressure on it occasioned a severe pain, not only at the instant, but lasting a considerable time afterwards. It seemed to be a tumour of a peculiar kind, well known to

surgeons as being occasionally found among the fibres of a nerve. This lady observed that she frequently awoke at night suffering from a frightful dream, which, although it related to some other and quite different subject, she could always trace to an accidental pressure on the tumour. In like manner children who labour under disease of the hip joint are often prevented from falling asleep by pains in the hip and knee, and painful startings of the limb; but when they are asleep, instead of these local symptoms, they are tormented by distressing dreams.

In cases such as these it is reasonable to suppose that the order of the phenomena is as follows. An impression is made on a nerve, and from thence transmitted to the brain, producing in its minute structure certain changes, which affect the mind itself. But there is no doubt that the same effect may be produced without the intervention of the nerves, by the blood acting on the brain. Bichat has shown that the influence of the scarlet or arterial blood is necessary to the due performance of the cerebral functions.

If dark-coloured, or venous blood, be substituted for it, and transmitted to the brain by the arteries, the animal lapses,—I will not say into a state of unconsciousness, for of that we know nothing,—but into a state of total insensibility to external impressions. This fact being established, we cannot be surprised that blood of an improper quality, or containing something which healthy blood should not contain, may disturb the functions of the brain, so as even to affect the mind itself. The habitual opium-taker, while his favourite drug is circulating in his vessels, instead of being set asleep, is visited by soothing and luxurious thoughts, and enjoys the contemplation of the great things which he means to accomplish, but which he never accomplishes in reality; while the Malay, under the influence of the East Indian hemp, is thrown into a state of excitement, and *runs a muck.** A man has been exposed to the contagion of small-pox. A minute quantity of the poison introduced into the blood acts as what the

* See Additional Note C.

chemists call a ferment, and occasions the generation in it of a larger quantity of poison similar to itself; and when a certain degree of accumulation of it has taken place, there is a severe attack of fever, and the mind probably is haunted by the phantasms of delirium. After a time the poison is ejected from the blood, and is found deposited in pustules on the surface of the skin, and simultaneously with the appearance of the eruption the fever subsides, and the delirium subsides with it. In a person who has the misfortune of inheriting a gouty habit, or who has (which is a much more common case) produced it in himself by a lazy and luxurious life, there is a superabundance of lithic acid in the blood. This fact has been established by the researches of Dr. Garrod. Then uncomfortable thoughts are presented to his mind; he becomes fretful and peevish, a trouble to himself and, if he be not trained to exercise a moral restraint over his thoughts and actions, a trouble to every one about him. After a while the poison, as it were, explodes: he has a severe attack of gout in his foot; he is placed

on a more prudent diet; the system is relieved of the lithic acid by which it was poisoned. Then the gout subsides; happy and cheerful thoughts succeed those by which the patient was previously tormented, and these continue until he has had the opportunity of relapsing into his former habits, and thus earning a fresh attack of the disease.

There is nothing more interesting in philosophy, nor more important as to practical purposes, than a just appreciation of the influence which the body exercises over the conceptions and feelings of the mind. Certain conditions of the former induce certain conditions of the latter. This is one of the principal trials to which we are here subjected; and according to our original construction, and some circumstances extraneous to ourselves, the trial is greater to some of us than it is to others. The result may be for good or for evil; and the practical question is, what can we do to promote the former, and lessen or prevent the latter? A diseased condition of the blood, where a morbid poison, as that of the small-pox,

or the more terrible one of hydrophobia, has been admitted into it, will disturb the nervous system in spite of ourselves. But though this cannot, there is much that can, be helped. No one having the smallest capacity for observation can doubt the vast influence which the condition of the body has on the temper, and even on the moral character. There are certain states of the general health in which the simplest impressions on the organs of sense may be transmitted to the sensorium with something superadded to them, which produces some kind of painful or uneasy feeling. There are others in which the effect is opposite to this. Hence we find one individual cheerful and hopeful under adversity, while another is unhappy and tired of life in the midst of all worldly prosperity. We are told, on high authority, of the necessity of self-control. We are also told how the effort of self-control may be rendered more easy by avoiding those sensual indulgences which tend to derange the functions of the animal system. This rule applies not merely to the profligate and the drunkard.

There is many a person in whom a muddled intellect and a peevish temper may be traced to a too great indulgence of the appetite—to eating more than the stomach can digest; to drinking a bottle, or even half a pint of wine daily, and leading otherwise a lazy and luxurious life, but who would be found to have no contemptible powers of mind, and cheerful spirits, if restricted to a more abstemious diet, and to drinking nothing more stimulating than toast and water.

"Orandum est ut sit mens sana in corpore sanô."

We are all anxious to obtain rank, reputation, and wealth; but that for which we have most reason to be anxious, not only for our own sake, but also for that of others, is such a state of our bodily functions as will enable us to make use of our higher faculties, and promote in us happy and contented feelings. Happiness, after all, is not so unequally distributed in this world as to a superficial observer it seems to be. Poverty is terrible if it be such as to prevent the obtaining the actual necessaries of life.

But the agricultural labourer who has enough of wholesome food, and warm clothing for himself and his family, and who has the advantage, which cannot be too highly estimated, of living in the open air, has more actual enjoyment of life than the inheritor of wealth, living in a splendid mansion, who has too much of lithic acid in his blood.

You will say that this is a worn-out tale. But let us pursue the subject further, and we shall find that it has extensive ramifications, questions arising out of it appertaining not only to individuals, but to the whole fabric of society. Much is said at present as to the necessity of extending education, as the means of improving the condition of the multitude. I am not so great a heretic as to deny the advantages of knowledge and of early instruction, especially if it be combined with a proper training of the mind, so as to give the pupil habits of self-restraint. But there is much to be desired besides. Nothing can tend more to every kind of moral and intellectual degradation than the vice of gin-drinking so prevalent in some, but

not in all, of the lower classes of society. In a conversation which I had with a very intelligent person employed by the "City Missionary Society," whose location was in London among the inhabitants of St. Giles's parish, he said, "I assure you that there is scarcely any one of them who might not obtain a comfortable livelihood if he could leave off drinking gin." But see how one thing hangs upon another, and how one evil leads to another evil. Mr. Chadwick has shown that many are driven to drinking gin as affording a temporary relief to the feelings of depression and exhaustion produced by living in a noxious atmosphere; and he gives instances of individuals who had spontaneously abandoned the habit, when they were enabled to reside in a less crowded and more healthy locality, where they could breathe a pure air, instead of loathsome exhalations. The case of such persons is analogous to that of others, who become addicted to the use of opium, as the means of relief from bodily pain. Schools and churches are excellent things, but it is a vast mistake to suppose that they will do all that is required.

There can be no feeling of contentment where there is an insufficient supply of wholesome food; and the "Temperance Society" can make few converts among those who live in crowded buildings, unventilated, and with imperfect drainage. Our late legislation has accomplished much, and probably as much as it can reasonably be expected to accomplish, towards the attainment of the first of these objects; and measures are now in progress which justify the expectation that eventually much good may be done in the other direction also.

CRITES. If such causes as those to which you lately referred may produce the effects which you have described; if an unhealthy state of the blood may give rise to delirium in fever, or illusions and horrors of mind in hydrophobia; if opium fills the mind with luxurious thoughts and visions having no foundation in reality; is it not probable that those greater and more permanent distractions of the mind which constitute the various forms of mental alienation may be traced to similar causes, that is, to some physical derangement affecting the

organ of memory, and thus disturbing the imagination?

ERGATES. I cannot doubt that mental alienation is generally the result of some wrong condition of the body, either functional or organic. Whether there be any exceptions to this rule, it would require more actual knowledge and experience of the subject than I pretend to possess, and more thought than I have bestowed on it, to enable me to determine. Probably there is no degree of knowledge, which it is in the power of man to attain, which could enable us to give a positive answer to this question. Putting it aside, however, for the present, there are abundant proofs that impressions may be made on the brain by other causes simulating those which are made on it by external objects through the medium of the organs of sense, thus producing false perceptions, which may, in the first instance, and before we have had time to reflect on the subject, be mistaken for realities. I have, indeed, already furnished an example of this in the visions presented to us in

our dreams under the influence of physical causes.

CRITES. I have been accustomed to believe that the latter are not, in reality, different from the objects commonly presented to us by the memory and the imagination; but seeming to be more distinct than usual, because during sleep we have no real objects with which we can compare them; in the same manner as the deception of a panorama depends in part on the circular form of the painting, which excludes real objects from the view.

ERGATES. In the visions belonging to our dreams there must be more than what you mention. A friend of mine, on awaking in the morning, perceived what seemed to be a human figure in a sort of Persian dress, standing at the foot of his bed. It was as distinct as the chairs and tables in the room, so that my friend was on the point of going up to it, that he might ascertain what, or rather who, it was. Looking, however, steadfastly at it, he observed that, although the figure was as plain as possible, the door behind it was plainly to be seen also,

and presently the figure disappeared. Considering the matter afterwards, he recollected that he had had a dream, in which the Persian figure played a conspicuous part; and thus the whole was satisfactorily explained, it being evident that the dream, as far as this part of it was concerned, had continued after he was awake, and so that the perception of the imaginary object had existed simultaneously with that of the real ones. The same thing occurred to the same person on another occasion, and similar histories have been related to me by others. It is probable that this is the history of many startling and mysterious tales of ghosts and spirits.

But phantoms similar to those which belong to dreams, and which like them do not vanish by an effort of the will, may, under certain circumstances, present themselves to those who are really awake. They may be the result of some actual organic disease of the brain. A gentleman, eighty years of age, had been for some time labouring under hypochondriasis, attended with other indications of cerebral disease.

On a cold day in winter, while at church, he had a fit, which was considered to be apoplectic. He was taken home and bled, and recovered his consciousness, not being paralytic afterwards. He died, however, in a few days after the attack. During this interval, though having the perfect use of his mental faculties, he was haunted by the appearance of men and women, sometimes in one dress, sometimes in another, coming into and loitering in the room. They were so distinct that, at first, he always mistook them for realities, and wondered that his family should have allowed such persons to intrude themselves upon him. But he soon, by a process of reasoning, corrected this error, and then talked of them as he would have talked of the illusions of another person. You have probably read the history of Nicolai, the bookseller of Berlin, who was haunted by visions of persons coming into his apartment, sitting down, and even conversing with him and with each other, and this during a period of several months. He also was at first taken by surprise, believing the phantoms to be real objects; but was soon

enabled to convince himself that they were not so. His recovery was attributed to an improved state of his bodily health. I must not weary you by referring to other instances of the same kind. The late Dr. Alderson, in an essay which he published nearly fifty years ago, gave an account of several which had occurred under his own observation, in individuals of perfectly sane minds*, and others have been since then recorded by other authors.

Examples of deceptive appearances analogous to these, but less remarkable, are not very uncommon. A gentleman of my acquaintance, of a very sensitive and imaginative turn of mind, informed me that, not unfrequently, when he had had his thoughts intensely fixed for a considerable time on an absent or imaginary object, he had at last seen it projected on the opposite wall, though only for a brief space of time, with all the brightness and distinctness of reality.

CRITES. If such a person had the misfortune to lose one of his family or a dear friend

* An Essay on Apparitions, by John Alderson, M.D.

by death, how easy would it be for him to believe that he had been visited by his apparition afterwards! It is probable that when Swedenborg supposed that he met Moses or Elias in the street, some such object was really presented to his mind; and that even Joanna Southcote, and others who have been regarded as a low order of impostors, were not altogether impostors, but in part the victims of their own imaginations. The subject is one which may well excite our curiosity, and I should be glad to obtain some further insight into it. Under what circumstances do these visions, so like those of our dreams, present themselves to the waking person? Where do they really exist, and what is their origin?

ERGATES. I have already stated that in the instance which I quoted on my own authority the existence of actual disease of the brain was indicated by other symptoms. I have also mentioned that in that of the bookseller of Berlin there was a deranged state of the general health, and that he recovered under a course of medical treatment. In all the

cases recorded by Dr. Alderson, the appearances were connected with actual bodily disease, which in two of them was of such a nature as especially to affect the nervous system. We may suppose the part actually affected to be the expansion of the nerve of sight in the retina of the eye; but it is more probable that it is that part of the brain itself which belongs to vision. In confirmation of this opinion, I may refer to a case recorded by Esquirol. A Jewess, who had been for a long time blind, became insane. Her illusions were of the sight, and she was constantly haunted by strange visions. After her death it was ascertained that the two optic nerves, from the part at which they are united within the head (which anatomists call their commissure), to their termination in the retinæ, were shrunk and wasted, so that they must have been wholly incapable of performing their functions.* I may also refer to another case which came under my own observation. A man met with

* Des Malades Mentales, vol. i. p. 195. edit. 1838.

an injury of the head, which, as the event proved, occasioned an extensive fracture in the basis of the skull, with such a displacement of bone as to press on the optic nerves, and render them wholly incapable of transmitting impressions to the brain. He was totally blind: otherwise he was not insensible, though he was slow in giving answers, and peevish when disturbed. On the second day after the accident, there were manifest symptoms of inflammation of the brain. He was in a state of great excitement, delirious, believing that he saw objects which did not exist; and he continued in this state until within a short period of his death.

CRITES. You have spoken of deceptions of the sight. Does nothing like this happen as to the other senses?

ERGATES. Certainly it does. The phantoms by which Nicolai was haunted are said to have conversed sometimes with him, sometimes with each other. I know a person, who amid the din of London streets occasionally has the perception of his being called by his name, so that

he involuntarily turns round to see who calls him. Sir Henry Holland has given an account of a much more remarkable case. A gentleman had symptoms of an affection of the brain, which was attributed to an accidental blow on the head. On the following day he had pretty well recovered. Two days afterwards he was well enough to drive out in his carriage. But now, "for the first time after the accident, there came on the singular *lusus* of two voices, seemingly close to his ear, in rapid dialogue, unconnected with any present occurrence, and almost without meaning." * It is not uncommon to find persons, who, when their attention is not otherwise occupied, are distressed by the sound of bells ringing. A gentleman, having what is commonly called a highly nervous temperament, had some teeth drawn while under the influence of chloroform. From that time, whenever his mind was not otherwise engaged, he was tormented by sounds as if a number of persons were yelling and

* Medical Notes and Reflections, 2nd edit. p. 232.

hooting him. I have been told of a great musical genius, who, from the earliest period of his life, has never been without the sounds of music of the most harmonious kind. Then as to the other senses. I remember a man who had a severe blow on the head, occasioning the symptoms which surgeons attribute to a concussion of the brain. He recovered from the other consequences of the injury; but for a long time afterwards everything that he ate had a bitter taste. The case of another person who had a constant sensation as if a burning coal had been applied to his arm belongs to the same class.

CRITES. But are not all such cases as those which you have described, to be considered as examples of mental derangement, though not in its worst and most aggravated form? and does not this correspond with the view of the subject taken by Locke, who regards this disease as affecting the imagination only, and not at all the reasoning faculty?

ERGATES. Certainly not; for with the exception of Swedenborg, no one of the individuals

whom I have just now mentioned mistook the deceptions as being connected with real objects. It is true, that some of those who are the subjects of mental derangement may see phantoms and hear strange voices; but they believe them to be realities, and cannot be persuaded that they are otherwise. Besides, as I am led to believe, it is not by this class of illusions that they are most liable to be tormented. As a morbid condition of the brain may produce the impression of visible objects, or of voices, which have no real existence, so it may also produce notions of a more complex and abstract character, and these may be constantly obtruded on the mind, so that the individual is unable to withdraw his attention from them, being, as it would seem, as much beyond the influence of volition as the muscles of a paralytic limb. Thus, one person believes himself to be ruined as to his worldly affairs, and that he and his family, though really in affluence, are reduced to extreme poverty; while another is persuaded that he is in possession of unbounded wealth, the consequence being that he is in danger of

being ruined by extravagance; and a third is under the apprehension of his being accused of some dreadful crime, and perhaps seeks a refuge from his fears in self-destruction. It is more difficult to escape from the latter than from the former class of illusions, as the appeal lies not from one sense to another, but to a more refined process of thought and reflection, and the examination of evidence.

With regard to the opinion of Mr. Locke, (and I beg of you to observe that I speak not pretending to have any practical knowledge of the subject, but viewing it merely as a physiologist), I own that it seems to me that he has laid down the rule too broadly, and that his explanation will not include the whole phenomena of insanity. In many insane persons, in addition to the illusions under which they labour, the capability of fixing the attention is almost entirely destroyed. The mind hurries on from one thing to another, as if it could find no resting-place; and under these circumstances it is plain that correct reasoning, which Locke defines as "the perception of the agreement or

disagreement of our ideas," is out of the question. At the same time, this does not prove that the reasoning faculty is primarily affected. The increased intensity of the action of the nervous system, and the imperfect subjection of it to the will, sufficiently explain the whole. In one case, the mind may be occupied with a single object, or a single idea, or combination of ideas. In another case, a constant and rapid succession of different, and perhaps heterogeneous, ideas is presented to it: and the will is equally powerless to dismiss the single idea in the former case, and to stop the current of different ideas in the latter.

In confirmation of these views, it may be observed, that mental derangement is in numerous instances preceded by a disordered state of the general health; and that it is not uncommon to find it alternating with diseases which affect merely the corporeal functions; or occurring under other circumstances which show that it must have been the result of mere physical agencies.

EUBULUS. You have certainly adduced

facts which justify the opinion that mental derangement may be, and for the most part is, the result of some actual physical imperfection, which we may suppose to be functional in some instances, organic in others; and I own that this is to me a very acceptable and consolatory view of the subject. But you cannot deny that in many instances it may be traced just as plainly to the operation of moral causes. The mind may break down all at once under some sudden affliction; or it may yield more gradually where the attention has been long and constantly and anxiously directed to some matter of unusual interest; and thus, the apprehension of poverty, the excitement arising from the unexpected possession of wealth, a gloomy and unholy religion, or a long indulgence in dreams of vanity and pride, may upset a vigorous intellect. Such facts as these cannot be questioned—and is not the conclusion from them inevitable?

ERGATES. I am quite aware that mental derangement may in many instances be traced to moral causes as its original source, and far

be it from me to assert that the one indivisible percipient and thinking being, which each of us feels himself to be, may not be in itself liable to changes, independently, of any previous change in the material structure with which it is associated. Still, in the facts which you have mentioned, there is nothing to contradict the opinion that the essence of the disease, even when produced by the operation of moral causes, may be in the nervous system. A physician, whose knowledge of these subjects is not surpassed by that of any one in Europe, assures me that "when mental derangement seems to have been induced by moral causes, it is generally to be presumed that there was originally an imperfect state of the brain, forming a predisposition to the disease." Then be it observed, that as the brain may influence the mind, so may the mind influence the brain. It is in this manner that volition, acting on the brain first, and on the nerves afterwards, produces muscular contractions; that grief causes tears to flow from the lachrymal gland; and that the mouth becomes parched, and the diges-

tion of the food interrupted, as a part of the consequences of mental anxiety. So, also, persons have been known to suffer from imaginary hydrophobia, experiencing not a few of the symptoms of that terrible disease. In such cases the mind is affected first, the nervous system afterwards; the latter re-acting on the mind, and confirming and continuing the illusion. If the functions of the brain should be thus disturbed during a very long period of time, it seems not improbable that some actual change will at last be produced in its organization; and indeed, it is not very easy otherwise to understand how mental derangement, induced by moral causes, should be permanent, when the causes themselves have been in operation only for a limited period. Nor is there in this anything more remarkable than the fact of organic disease of the heart being in some instances distinctly to be traced to anxiety of mind.

CRITES. All this is to me a matter of curious speculation; but it leads to another subject, in which I feel a still greater interest; partly because, from the special nature of my

pursuits, it is sometimes forced on my attention; and partly because out of it arise questions, which, as they affect our social system, are of great practical importance to us all. Some writers have described, under the name of Moral or Instinctive Insanity, a state of mind in which they say that there are no illusions, nor any affection of the intellect; but in which there is simply a perversion of the moral sentiments; the individual labouring under an impulse to perform certain extravagant and outrageous acts, injurious to himself or others; such impulse being irresistible, so that he is to be held as being no more responsible for his conduct than an ordinary lunatic. Now I own that, looking at the question merely as one who has some knowledge of human nature, and with no other aid than that of my own common sense, I am very much inclined to doubt the correctness of this doctrine, and I am certain that it is dangerous to admit the plea of irresponsibility for those who labour under this so-called Moral Insanity, to the extent to which Dr. Pritchard and others have claimed it for

them. Observe, that I use the term Moral Insanity, not as comprehending cases in which there is a belief in things that do not exist in reality, or cases of idiotcy, or those approaching to idiotcy; but limiting it strictly and exclusively to the definition given by writers on the subject. The law makes a reasonable allowance of time for the subsiding of passion suddenly provoked. But we are not, therefore, to presume that the same allowance is to be made for those in whom a propensity to set fire to their neighbours' houses, or commit murder, is continued for months, or weeks, or even for hours. Is it true that such persons are really so regardless of the ill consequences which may arise, so incapable of the fear of punishment, and so absolutely without the power of self-restraint, as they have been sometimes represented to be? If not, there is an end of their want of responsibility. Let me refer here to the instance of the gouty patient, some time since adduced by Ergates. Under the influence of his disease every impression made on his nervous system is attended with

uneasy sensations. If such a person has exerted himself to acquire the habit of self-control, the evil ends with himself; but otherwise, he is fractious and peevish; flies into a passion, without any adequate cause, with those around him, and uses harsh words which the occasion does not justify; conduct of which he can offer to himself no explanation, except that he cannot help it; and for which, if he be a right-minded person, he is sorry afterwards. If he were to yield to the impulse of his temper so far as to inflict on another a severe bodily injury, ought it to be admitted as an excuse, that Dr. Garrod had examined his blood, and found in it too large a proportion of lithic acid? Yet, when the boy Oxford yielded to what was probably a less violent impulse, which caused him to endeavour to take away the life of the Queen, the jury acquitted him, on the ground of his being the subject of "Moral Insanity." It seems to me that juries have not unfrequently been misled by the refinements of medical witnesses, who, having adopted the theory of a purely moral insanity, have applied that term

to cases to which the term insanity ought not to be applied at all. It is true, that the difference in the character of individuals may frequently be traced to difference in their organizations, and to different conditions as to bodily health; and that, therefore, one person has more, and another has less, difficulty in controlling his temper, and regulating his conduct. But we have all our duties to perform, and one of the most important of these is, that we should strive against whatever evil tendency there may be in us arising out of our physical constitution. Even if we admit (which I do not admit in reality) that the impulse which led Oxford to the commission of his crime was at the time irresistible, still the question remains, whether, when the notion of it first haunted him, he might not have kept it under his control; and thus prevented himself from passing into that state of mind which was beyond his control afterwards. If I have been rightly informed, Oxford was himself of this opinion; as he said, when another attempt had been made to take away the life of the Queen,

"that if he himself had been hanged this would not have happened." We have been told of a very eminent person who had acquired the habit of touching every post that he met with in his walks, so that at last it seemed to be a part of his nature to do so; and that if he found that he had inadvertently passed by a post without touching it, he would actually retrace his steps for the purpose. I knew a gentleman who was accustomed to mutter certain words to himself (and they were always the same words), even in the midst of company. He died at the age of ninety, and I believe that he had muttered these words for fifty or sixty years. These were foolish habits; but they might have been mischievous. To correct them at last would have been a very arduous undertaking. But might not this have been easily done in the beginning? and if so, — if instead of touching posts, or muttering unmeaning words, these individuals had been addicted to stealing or stabbing, — ought they to have been considered as absolved from all responsibility? It has been observed by a

physician, who has had large opportunities of experience in these matters, that "a man may allow his imagination to dwell on an idea until it acquires an unhealthy ascendancy over his intellect."* And surely, if, under such circumstances, he were to commit a murder, he ought to be held as a murderer, and would have no more claim to be excused than a man who has voluntarily associated with thieves and murderers until he has lost all sense of right and wrong; and much less than one who has had the misfortune of being born and bred among such malefactors.

ERGATES. I have no doubt, as you have expressed it, that those who have maintained the doctrine of "Moral Insanity," have often applied that term to cases to which the name of Insanity ought not to have been applied at all. But I also have no doubt that there has been much mystification of the subject, by the application of the same term to other cases in which illusions really existed, and which might,

* Anatomy of Suicide, by Forbes Winslow, M.D.

therefore, have been more properly classed with cases of ordinary mental aberration. At the same time, we must not overlook the fact that there may be, and sometimes is, a real difficulty in determining whether a man who abandons himself to an evil passion, or a mischievous or absurd propensity, labours under illusions or not. For example: a disease has been described under the name of Bulimia, in which the patient is affected with an inordinate appetite, which nothing can satiate, and which his will seems powerless to resist. One individual, whose case is recorded in the Transactions of the Royal Society, would eat an ordinary leg of veal at a single meal, adding to it a store of sow-thistles, and other wild vegetables.* Another would devour raw, and even living cats, rats, and dogs, the entrails of animals, and candles, to the extent of fourteen pounds daily.† Now, except that the passion has another object, there seems to be no essential difference between these cases and that of a man who squanders

* Philosophical Transactions, vol. xxii.

† London Medical and Physical Journal.

his property, purchasing articles for which he has no use, and which he immediately lays aside, reckless of the ruin which he is bringing on himself, his wife, and children. But it may be urged, on the other hand, that in Bulimia the sense of hunger, where food is not really required, and which nothing can allay, may not improperly be regarded as an illusion; having, at any rate, a considerable resemblance to the visions, voices, or unfounded conceits, which haunt the imagination of an ordinary lunatic.

CRITES. There seems to be some truth in this comparison. But let us suppose that your patient with Bulimia were to be in the habit of robbing butchers' shops and larders, ought he to be considered as not being responsible for his actions, because he was driven to do so by his inordinate appetite? And this leads me to offer one farther observation. If we are not to confound merely mischievous propensities with illusions, we are also not to admit the mere existence of an illusion, as being in all cases an excuse for crime. A thorough-going

Socialist may be conscientiously persuaded that the unequal distribution of property is contrary to religion and morality. The conviction may be so strong that he not only disregards, but cannot comprehend, the arguments which satisfy men of sober sense that his views are erroneous and absurd. Is this anything more or less than an illusion; and if, under its influence, he were to appropriate to himself his neighbour's property, or abet others in taking it for themselves, is he, therefore, to be regarded as not responsible for what he does? it being borne in mind that the object of human punishment is, not to revenge society on the malefactors, but to deter others from following their example. There are many dogs whose natural and original instinct leads them to run after and kill sheep; but a proper discipline teaches them that they are not to do so, and counteracts the instinct. There are, undoubtedly, instances without number of illusions, which not only have a firmer hold on the human mind than this particular instinct in dogs, but which neither argument nor discipline can remove or even control: but

it is not so in other cases; and surely there is no reason why those of the latter class should not be overruled by means analogous to those which overrule the instinct of the brute. Dr. Mayo, whose attention has been directed, with much success, to this class of inquiries, has arrived at this conclusion, and I do not see how any one can well differ from the opinion which he has expressed.*

EUBULUS. Believing as I do, with Crites, that the subject which you are now discussing is one of great importance as it affects society at large, I have listened with much interest to the observations which you have made. You, Crites, have pointed out the necessity of not confounding, as has been sometimes done, mischievous or absurd propensities, however strong, with actual insanity. You, Ergates, have endeavoured to show that there is no broad line, by which the former can always be distinguished from the latter; and I am inclined to agree with both of you. But I also cannot but assent to

* See Additional Note D.

the opinion of Crites, when he farther stated that the existence of illusions is not in every instance to be regarded as justifying the plea of want of responsibility. It certainly seems to me to be not less absurd in itself than it is dangerous to society at large, to hold that any one, whom the dread of being punished might deter from the commission of crime, is not a fit subject for punishment. At the same time I fully admit that a more or less unsoundness of mind may afford a sufficient reason for commuting, or modifying, the nature of the penalty. Allow me to add, that it is a very great mistake to suppose that this is a question which can be determined only by medical practitioners. Any one of plain common sense, and having a fair knowledge of human nature, who will give it due consideration, is competent to form an opinion on it, and it belongs fully as much to those whose office it is to administer the law, as it does to the medical profession.

THE FOURTH DIALOGUE.

Different Functions of the Brain and Spinal Chord. — Continuance of Life in some Animals without the Brain. — Automatic Motions of Plants and of some of the lower Animals. — Multiplication of the latter by Division. — The Diplozoon Paradoxon. — Buffon's View of the Mode of Existence of the lower Animals. — A Nervous System not necessary to simple animal Life. — Origin of the nervous Force. — Influence of the venous or dark-coloured Blood on the Functions of the Nervous System. — The Absence of Sensibility or voluntary Power no Proof of the Absence of Consciousness. — Dr. Wollaston, &c. — State of Mind preceding Death. — Nature and Phenomena of Sleep. — Dreams the Result of the Imagination uncontrolled by the Will. — Rapidity of Dreams. — Their Character influenced by accidental physical Impressions. — Supposed Solutions of Problems, &c. during Sleep. — Muller's Observations on the Subject. — Do Dreams answer any Purpose in the Economy of living Beings? — Inquiries as to the Nature of the Changes which occur in the Nervous System in connection with Mental Operations.

THE clear transparent atmosphere of the preceding day was followed, as might have been anticipated, by rain, which confined us to the house. In the afternoon we were assembled in Eubulus's library, and had been for some

time conversing in a desultory manner, when the subject of our former discourse was thus resumed.

CRITES. Ergates regards the brain, properly so called, as the physical organ by means of which alone (to use his own expression) the one indivisible percipient and thinking being, which each of us feels himself to be, maintains its communication with the external material world. But I own that he did not quite satisfy me that this opinion is correct, and I should be glad to make some farther inquiries on the subject. *A priori*, there is no reason why the mind should not be in connection with any, and every, other part of the nervous system; why it should not be present in the eye, and at once, and without the intervention of any other organ, have a direct perception of the picture of external objects which is painted on the retina; or a similar perception of the impressions which the waves of sound make on the nerves in the labyrinth of the ear; or of those which we refer to the sense of touch in the hands or feet, or elsewhere on the surface of the body. Then, if I am

not misinformed, the spinal chord in some of the lower animals of the vertebrate class is of considerably larger size than the brain itself. May we not, therefore, conclude that it is at least equal to the brain as to the importance of its functions? Again, mankind have, very generally, referred hope and fear, joy and sorrow, love and hatred, to the heart. May they not have their special seat in the nerves of that organ? I have understood that a distinguished French physiologist supposed what you anatomists call the great sympathetic nerve, (which I understand to be connected with, but nevertheless distinct from, both the brain and the spinal chord) to be the actual seat of that class of mental conditions which we call the passions or emotions.

ERGATES. I agree with you in the opinion that, *à priori*, there is no reason why all this should not be as you suggest. The only question is as to the matter of fact. You may recollect that in the course of our conversation yesterday, I referred to two cases, in one of which pressure on the optic nerve, and in

the other disease of the same nerve, occasioned total blindness; but in which nevertheless the individuals thus affected were haunted by illusions, believing that they saw objects which did not actually exist. So if the nerves be divided or materially injured in the thigh, the sense of touch is destroyed in the foot: while, if the leg be amputated, the patient for a long time afterwards feels his feet and toes as if they still belonged to him. The conclusion to be drawn from these facts is sufficiently obvious.

With regard to the spinal chord, we know that it exercises functions of the greatest importance in the animal economy, generating the nervous energy, which is required for muscular action; influencing the secretions; in part regulating the motions of the heart; and probably helping to maintain the action of different organs in that sympathetic union and harmony which is necessary to the due performance of their several functions. The size of the spinal chord bears an exact proportion to what is required of it in those respects, while it has no relation whatever to the faculties of perception and

thought. It is true that the spinal chord is composed of the same materials as the brain, in the form of the grey and vesicular, and the white or fibrous substance; but in the former there is throughout a constant repetition of the same structure; while in the brain, as indeed I explained formerly, there is an almost endless variety as to the mode in which the two elementary substances are arranged; so that we recognise in it, not a simple and uniform organ, but a congeries of organs, each having a peculiar structure, and being evidently intended to answer a special and peculiar purpose. A large extravasation of blood within the head, by the pressure which it causes on the brain, induces a state in which there is a total insensibility to all external impressions, and at the same time an entire suspension of the influence of volition. But the effect of a similar injury of the spinal chord is widely different. The parts below the injury, the communication of which with the brain is thus interrupted, are deprived of their sensibility. The muscles are no longer subjected to the dominion of the will, although

they may still contract on the application of mechanical stimuli or electricity. The lower limbs may be made to start by tickling the soles of the feet. But those motions are merely automatic, and we have no reason to believe that they are attended with sensation, or preceded by volition, any more than those of the leaves of the *Mimosa sensitiva*. At the same time, in those parts of the body which are above the injury, and whose nervous communication with the brain is not interrupted, the sensibility and power of voluntary motion are unimpaired, as are also the mental faculties. Singular indeed is the condition of the individual, in whom there has been a laceration, or other severe injury of the spinal chord in that part of the neck which is immediately below the origin of the nerves belonging to the diaphragm. In him respiration, though imperfectly performed, continues, so that life may be maintained during a period which varies from twenty-four hours to five or six days. He retains his consciousness; he can see and hear, and comprehend what passes around him, but

except his head, and the upper part of the neck, his body is as if it did not belong to him. He is a living head, and nothing more. I saw a lady under these circumstances with her mind as active, her sympathy with others, and her sense of duty as perfect, as before the injury had occurred. In fact, the result which follows any severe injury of the spinal chord, though greater in extent, is of the same kind as that which follows the division of a nerve. Then, as to Bichat's hypothesis of the passions or emotions having their seat in the great sympathetic nerve; on a former occasion I referred to the effect of grief in causing tears to flow from the lachrymal gland, and of mental anxiety in stopping the secretion of saliva, and interfering with the digestion of the food in the stomach; and we all know the influence of deep emotion on the action of the heart; but surely it would be a very far-fetched conclusion to infer from such facts as these that grief resides in the ophthalmic branch of the nerve of the fifth pair, or hope and fear in the nerves which supply the heart. Indeed, they show nothing

but this, that as certain states of mind affect one class of muscles by means of volition, so other states of mind affect other muscles, or other organs, without the volition being exercised.

We must regard the animal appetites and instincts as being intimately connected with the nervous system, and as having their special places allotted to them in it. But we are not warranted in drawing the same conclusion as to the emotions and passions, properly so called. Hope and fear, joy and sorrow, pride and shame, these, and such as these, are conditions of the mind, which have no abstract or independent existence; but which, as they may be superadded to our perceptions and thoughts, admit of being excited and acted on through the medium of the nervous system. At the same time, as far as we can see, they have no special locality in it.

EUBULUS. But has it not been stated that there are some of the less perfect vertebrate animals, which actually survive decapitation, and live even for several months after being

thus deprived of the brain? and is it not the case that some of the lower grade of animals admit of being divided into parts, and that each of these becomes a distinct individual, as if in them the mental principle resided in the animal generally, and were itself capable of division?

ERGATES. You refer to the observations of Le Gallois, who found that certain lizards lived for a very considerable time after the loss of the head; and that, when they died at last, the immediate cause of death appeared to be the want of food. But creatures under such circumstances exhibit no sign of anything more than automatic life. Even breathing is suspended, the blood probably deriving the little oxygen which is required, not from air drawn into the lungs, but from being exposed to the atmosphere in the superficial vessels of the skin. It is true that if the legs be pinched under these circumstances the muscles are made to contract; but this is no more a proof of sensibility than the starting of the limbs, which I have already mentioned as occurring in the human being, on tickling the

soles of the feet after an injury of the spinal chord; or the convulsions of epilepsy. Then as to the multiplication of some of the lower orders of animals by division, we know so little of their mode of existence, and it is so entirely different from that of animals of the higher orders, that it really seems to me that we can draw from it no conclusion that would be well applicable to the latter. Is it at all certain that the polypus, in which we find no traces of a nervous system, is really endowed with any higher properties than those of vegetable life? Do the motions of its filaments afford any better evidence of sensibility than is exhibited by many plants, such as the fly-catching *Dionæa*, or the *Mimosa sensitiva?* or than the motions of the minute bodies termed *cilia* in animals? Do not the lacteals show as much discrimination in selecting the chyle, and rejecting other fluids which are not fitted for nutrition, as the polypus shows in catching its food, yet without our being conscious of it? Or, granting the sensibility of the polypus, may it not be a compound animal with various centres of sen-

sation and volition, in like manner as in a tree every bud is a distinct individual, which may live and grow though separated from the parent stock? An example of this mode of existence is supplied by an animal much above the polypus in the scale of living beings. The *diplozoon paradoxon* is described by Nordmann as a parasitic animal which attaches itself to the gills of the *Cyprinus Brama*. It consists in fact of two animals, united in the centre so that they have a part of their viscera in common, but with two distinct nervous systems. As far as the latter are concerned, there is no reason why each half of this double creature should not live very well, though separated from the other.*

I am aware that one of our most celebrated modern physiologists, from observing the multiplication of polypi by the mere division of the animal, and from some other circumstances, has come to the conclusion which you have suggested, that the mental principle, which to our conceptions presents itself as being so preeminently, above all other things in nature, one

* Annales des Sciences Naturelles, vol. xxx. 1833.

and indivisible, is nevertheless itself divisible, not less than the corporeal fabric with which it is associated. But it is to be observed that, great as is the authority of Müller generally in questions of physiology, in the present instance he may be in some degree prejudiced by his inclination to the pantheistic theory, which has descended from the school of Pythagoras to these latter times, as it had before been derived by him from the Buddhists of the East; and which teaches that all the innumerable variety of living beings which we see around us, are but different manifestations, and as it were emanations, of the one vast intelligent spirit which pervading the universe

"Agitat molem et magnô se corpore miscet."

EUBULUS. If my recollection be accurate, Buffon regards the condition of some of the lower animals, taking the oyster as an example, as being that of constant and profound sleep, meaning that they have neither sensation nor volition.

ERGATES. However that may be, there is no

doubt that mere animal life may exist without either the one or the other, or without anything that bears even the most remote relation to the mental principle. For instance, Dr. John Clarke has given an account of "an extraordinary product of human generation," in which there was "neither brain, spinal marrow, nor nerves, nor heart, nor lungs," but which was nevertheless a living organized mass, containing several bones tolerably well formed, and vestiges of some other organs.*

As I have already mentioned, the nervous system is composed of two substances of different organization; the one, which is commonly called the medullary, being of a white colour, of a soft consistence, which may be proved by a careful dissection to be composed of fibres; the other of vesicular or cellular structure, of a still softer consistence, more largely supplied with blood-vessels, presenting no fibrous appearance, and of a gray colour. This gray matter exists in much smaller quantity than the medullary,

* Philos. Transactions, 1793, p. 154

being disposed in layers in which the fibres of the latter seem to have their origin. It is generally supposed that the function of the medullary substance is to conduct, direct, and make use of the nervous force, the latter being generated in the gray substance, and being in itself always one and the same, though converted to different purposes in different parts; much as the electricity generated in a voltaic battery is made by means of one apparatus to produce chemical decomposition, and by means of others to direct the needles of a telegraph, or convert common iron into a magnet. We may carry the parallel between the nervous and the electric force further still. Although the gray matter of the nervous system is necessary for the production of the former, it is not in itself sufficient, any more than the alternate plates of zinc and copper are sufficient for the production of electricity. The acid solution added to the voltaic battery is required in the one case, the presence of blood which has obtained a scarlet colour and undergone other changes by exposure to the air in the lungs, is necessary in the other. In some

animals of the cold-blooded classes the sensibility as to external impressions, and the power of voluntary movement, may indeed remain after the supply of scarlet blood has ceased, but it is only for a short period of time; while in man and in other warm-blooded animals the suspension of the same faculties, under the same circumstances, seems to be, not absolutely, but almost instantaneous. In a person who is drowned, or otherwise suffocated, and in whom the dark-coloured blood is transmitted to the brain by the action of the heart, two or three minutes are sufficient to produce the effect which has been described. This has been fully explained by Bichat, whose observations on the subject I had occasion to mention formerly. If you wish to obtain further information on it, and will refer to the "*Récherches sur la vie et la mort,*" you will be well rewarded for your labour.

EUBULUS. Under this view of the subject, the dark-coloured blood affects the brain simply by a negative influence; by depriving it of that, whatever it may be, which exists in the scarlet

blood, but not in the dark-coloured blood, and which is necessary to the generation of the nervous force. But, if this were all, the brain ought to resume its functions immediately on the supply of scarlet blood being restored. Is it so in reality? I have heard of drowned persons who remained insensible for a long time after they were taken out of the water, although they recovered ultimately.

ERGATES. Your observation is quite correct. In fainting, or, as we technically term it, in syncope, the supply of blood to the brain is interrupted altogether, — both of that which is scarlet, and of that which is dark-coloured; and if the syncope be complete, there is a state of apparent insensibility, from which, however, when the action of the heart is restored, the patient very soon recovers. But the dark-coloured blood, if it has once been transmitted to the brain, even for two or three minutes, leaves an impression on it, from which it may not recover for half an hour or even longer. After strangulation, especially, individuals have sometimes remained in a state of apparent in-

sensibility for some hours. In fact the dark-coloured blood transmitted to the brain operates as a narcotic poison. I need scarcely remind you that there are very many foreign substances, as for example alcohol, chloroform, opium, the woorara, which introduced into the circulation produce the same effect, even though the supply of scarlet blood is not interrupted. Of the *modus operandi* of such terrible agents we are wholly ignorant. All that we know is the simple fact, that when their operation is complete, they render the brain insensible to the impressions made on the external senses, and incapable of transmitting the influence of volition to the muscles. Pressure on the brain or a stroke of lightning may produce the same effect.

EUBULUS. In short, a condition of the brain producing unconsciousness may be produced in various ways.

ERGATES. I have purposely avoided using the word unconsciousness, for as to that it is plain that we know nothing. The mind may be in operation, although the suspension of the

sensibility of the nervous system, and of the influence of volition over the muscles, destroys its connection with the external world, and prevents all communication with the minds of others. It is indeed difficult to say even when the external senses are completely and absolutely closed. I might refer to numerous facts which have fallen under my observation as illustrating this subject; but the following will be sufficient. An elderly lady had a stroke of apoplexy: she lay motionless, and in what is called a state of stupor, and no one doubted that she was dying. But after the lapse of three or four days, there were signs of amendment, and she ultimately recovered. After her recovery she explained that she did not believe that she had been unconscious, or even insensible, during any part of the attack. She knew her situation, and heard much of what was said by those around her. Especially she recollected observations intimating that she would very soon be no more, but that at the same time she had felt satisfied that she would recover; that she had no power of expressing

what she felt, but that nevertheless her feelings, instead of being painful or in any way distressing, had been agreeable rather than otherwise. She described them as very peculiar; as if she were constantly mounting upwards, and as something very different from what she had ever before experienced. Another lady, who had met with a severe injury of the head, which caused her to be for some days in a state of insensibility, described herself as having been in the enjoyment of some beatific visions, at the same time that she had no knowledge of what had actually happened, or of what was passing around her. I have been curious to watch the state of dying persons in this respect, and I am satisfied that, where an ordinary observer would not for an instant doubt that the individual is in a state of complete stupor, the mind is often active even at the very moment of death. A friend of mine who had been for many years the excellent chaplain of a large hospital, informed me that his still larger experience had led him to the same conclusion. A remarkable example of this occurred in the

case of the late Dr. Wollaston. His death was occasioned by a tumour of the brain, which, after having attained a certain size, encroached on the cavities (or, as they are technically termed, the ventricles) of the brain, and caused an effusion of fluid into them, producing paralysis of one side of the body; and it is worthy of notice that certain symptoms which he had himself noted, and as to the cause of which he had been in the habit of speculating, proved that this organic disease must have existed from a very early period of his life, without interfering with those scientific investigations which made him one of the most eminent philosophers, and one of the greatest ornaments, of the age in which he lived. During his last illness his mental faculties were perfect, so that he dictated an account of some scientific observations which would have been lost to the world otherwise. Some time before his life was finally extinguished he was seen to be pale, as if there were scarcely any circulation of blood going on: motionless, and to all appearance in a state of complete insensibility. Being in this condition,

his friends who were watching around him observed some motions of the hand, which was not affected by the paralysis. After some time it occurred to them that he wished to have a pencil and paper, and these having been supplied, he contrived to write some figures in arithmetical progression, which, however imperfectly scrawled, were yet sufficiently legible. It was supposed that he had overheard some remarks respecting the state in which he was, and that his object was to show that he preserved his sensibility and consciousness. Something like this occurred some hours afterwards, and immediately before he died, but the scrawl of these last moments could not be decyphered.*

EUBULUS. You might refer, as confirming the observations which you have just made, to that interesting letter of Sir Francis Beaufort (which some of us had seen long ago in manuscript, and which is now generally known, having been published by the late Sir John Barrow in his autobiography), in which the writer describes what happened to himself when he was pre-

* See Additional Note E.

served from being drowned; when "every incident of his former life seemed to glance across his recollection in a retrograde succession, not in mere outline, but the picture being filled with every minute and collateral feature," forming "a kind of panoramic view of his entire existence, each act of it accompanied by a sense of right and wrong." *

ERGATES. I have been informed of some other cases in which the same thing happened, and all this must have been in the brief space of a very few minutes. But I have also been informed of other instances of individuals whose minds had been affected very much in the same way when they were suddenly placed in a situation which threatened immediate death, although they were not at all deprived of their sensibility and self-possession. It is probable that histories such as these suggested that rather curious tale of the Chec Chehabeddin and the Infidel Sultan of Egypt, which used to astonish my youthful imagination,

* Autobiographical Memoir of Sir John Barrow, Bart., p. 398.

n reading the Persian and Turkish tales. The ıccounts, however, given after recovery from lrowning, vary very much. Some, whatever they nay have felt at the time, remember nothing :xcept their having been overcome by a sense of nsuperable drowsiness. In one instance, as a ıaval officer informed me, a sailor who had been natched from the waves, after lying for some ime insensible on the deck of the vessel, pro- laimed on his recovery that he had been in Ieaven, and complained bitterly of his being estored to life as a great hardship. The man ad been regarded as a worthless fellow; but :om the time of the accident having occurred, is moral character was altered, and he be- ame one of the best conducted sailors in the hip.

Eubulus. We may conclude, from what ou now have stated, that drowning, terrible as appears to be, is not, after all, either morally r physically, a painful death; and this is con- rmed by the experience of a friend of my wn, who very nearly lost his life in this ıanner. He says that the last thing which

he remembers is looking at the pebbles and weeds at the bottom of the river, with little or no fear of what was about to happen, and no bodily suffering. I suppose that it is the same whenever death takes place in the same manner: in cases of strangulation, for example.

ERGATES. Really, according to my observation, the mere act of dying is seldom, in any sense of the word, a very painful process. It is true that some persons die in a state of bodily torture, as in cases of tetanus; that the drunkard, dying of *delirium tremens,* is haunted by terrific visions; and that the victim of that most horrible of all diseases, hydrophobia, in addition to those peculiar bodily sufferings from which the disease has derived its name, may be in a state of terror from the supposed presence of frightful objects, which are presented to him as realities, even to the last. But these and some other instances which I might adduce are exceptions to the general rule, which is, that both mental and bodily suffering terminate long before the scene is finally closed. Then as to the actual fear of death: it seems

to me that the Author of our existence, for the most part, gives it to us when it is intended that we should live, and takes it away from us when it is intended that we should die. Those who have been long tormented by bodily pain are generally as anxious to die as they ever were to live. So it often is with those whose life has been protracted to an extreme old age, beyond the usual period of mortality, even when they labour under no actual disease. It is not very common for any one to die merely of old age:—

"Like ripe fruit to drop
Into his mother's lap."

But I have known this to happen; and a happy conclusion it has seemed to be of worldly cares and joys. It was like falling to sleep, never to awake again in this state of existence. Some die retaining all their faculties, and quite aware that their dissolution is at hand. Others offer no signs of recognition of external objects, so that it is impossible for us to form any positive opinion whether they do or do not retain their sensibility; and others, again, as I have already

stated, who appear to be insensible and unconscious, when carefully watched, are found not to be so in reality; but they die contentedly. I have myself never known but two instances in which, in the act of dying, there were manifest indications of the fear of death. The individuals to whom I allude were unexpectedly destroyed by hæmorrhage, which, from peculiar circumstances, which I need not now explain, it was impossible to suppress. The depressing effects which the gradual loss of blood produced on their corporeal system seemed to influence their minds, and they died earnestly imploring that relief which art was unable to afford. Seneca might have chosen an easier death than that from opening his arteries.

EUBULUS. In the account which you have now given us, it seems to me that you have made a considerable omission, inasmuch as you have said nothing as to the influence of religious sentiments on the minds of dying persons; of the hopes and fears connected with the retrospect of a well-spent or ill-spent life, and with the prospect of what is to happen

after the greatest and most mysterious change belonging to humanity has taken place.

ERGATES. You have called our attention to a subject involving considerations to which no one can be indifferent. But you do me an injustice, if you suppose that I have been unmindful of it. What I have said refers only to the last stage in the process of dissolution. There is no doubt that a pure and simple religious faith, and a firm reliance on the Being who has placed us here, contribute more than anything besides to disarm death of its terrors, deprive "the grave of its victory," and smooth the passage of the humble and sincere believer to the termination of his worldly career. Nevertheless, according to my own experience, and what I have heard from others, the influence of religious feelings is, for the most part, not so much perceptible at the moment when death is actually impending, as it is at an earlier period, when the individual, who was previously in health, or supposed himself to be so, first discovers that it is probable that he will die.

CRITES. You have compared death from

mere old age to falling asleep never to awaken again in this world. This brings us to another subject, not very distantly related to that which we have been just discussing; at least, so thought the Latin poet, when he wrote —

"Quid est somnus, gelidæ nisi mortis imago?"

What is sleep itself? Wherefore is it required? What is the condition of the nervous system on which it immediately depends? And what, during sleep, is the actual condition of the physical and mental faculties?

ERGATES. One of your questions certainly cannot be answered. It is plain that in some respects the condition of the nervous system must be different during sleep from what it is when we are awake; but it seems impossible that we should know in what that difference consists, when we consider that neither our unassisted vision, nor the microscope, nor chemical analysis, nor any analogy, nor any other means at our disposal, enable us to form any kind of notion as to the actual changes in the brain or spinal chord on which any other nervous phenomena depend. Then, as to the other

points to which you have adverted, the subject has been so frequently treated of by others, that there is little or nothing new to remark upon it.

It appears that in human beings, and in all animals of the higher classes, those functions, which Bichat has described as constituting the system of organic life, may continue to be performed without the need of repose; but that it is quite otherwise with regard to those which the same physiologist has referred to animal life, and which are connected with the mental principle. It is for the latter, and not for the former, that sleep is required. As Eubulus observed on a former occasion, the action of the heart, and of the muscles of respiration, the digestion of the food, the various secretions, the generation of animal heat, all these functions are performed during sleep, as well as when we are awake; and, so far, the sleep of human beings differs very much from the torpor of hybernating animals, in whom, during the winter, these functions are reduced to the very lowest degree of activity. But, if we extend

our inquiries to the functions of animal life, we find, that if we act with the voluntary muscles, if we think, and even if we merely attend to the sensations which are derived through the organs of sense, or to those which arise spontaneously in our minds, after a time what we call a sense of weariness arises, and we require repose; and it is this repose which sleep affords us. It would appear that during sleep there is an accumulation of the nervous force, which is brought into use, and gradually expended after sleep is terminated; the expenditure of it being greater, and the exhaustion more complete accordingly as the volition is more or less exercised. The muscles of the limbs may be for a long time in a state of involuntary contraction (as in cases of tetanus or catalepsy) without weariness being induced; but under the influence of the will, they cannot remain contracted for more than a few minutes at a time. In like manner visions may pass before the mind when it is entirely passive, without causing fatigue; but it is quite otherwise when we endeavour to arrest their pro-

gress, to view them under different aspects, and to compare them with each other. This occasions weariness, and the necessity of repose, as much as voluntary muscular exertion; and, at intervals, of that complete repose which belongs to sleep; and these things justify the opinion, which though it might not have originated with him, was first brought into notice by Dr. Darwin, that the essential part of sleep is the suspension of volition.

CRITES. But some objections may be made to this explanation. We see persons turn round in their sleep, and hear them talk in their sleep, which must be regarded as a proof that their volition is exercised. Besides, we breathe in our sleep, and is not this a voluntary process?

ERGATES. Such objections are easily answered. There are, in fact, degrees of sleep. It may be so incomplete that the individual may be moving and awaking at intervals during the whole night. As to breathing, I apprehend that no one who is at the pains to consider the subject can doubt that, although to a certain extent

it may be influenced by the will, this function is, under ordinary circumstances, as independent of it as the action of the heart, or the peristaltic motion of the intestines. We may by a powerful effort suspend the action of the respiratory muscles during a limited time. It is said that the divers for pearls can do this for a minute, or even longer. At last, however, the will is powerless, and we breathe in spite of it. Again, you may say that a sound or touch, which would be heard or felt by a waking person, may not affect us at all when we are asleep; and that this shows that there is something more than the mere absence of volition. But observe, at all times, what a multitude of impressions are made on our senses, of which we take no cognisance. I am engaged in writing a letter, or in reading a book in which I am much interested; a friend comes into the room, opens and shuts the door, or he may even speak to me in his ordinary tone of voice, and I know nothing of it. It is obvious, that unless our attention be directed to them, the impressions on our senses are not communi-

cated to the mind; and such an effort of attention implies an effort of volition? But my friend speaks to me in a louder tone, which rouses my attention; and then I hear all that he says in his ordinary voice afterwards. So it is during sleep. Those smaller sounds which we hear distinctly when we lie awake, in the stillness of the night, are during sleep unnoticed. So is the light from the rushlight. But a tempest of wind, or the morning sun pouring in his rays through the window, rouses our attention, and with this effort of attention sleep is terminated.

I may here refer to the state of mind during what is popularly termed "the nightmare," as illustrating this subject. In this case sleep is imperfect. We are to a certain extent aware of our situation. We know where we are, but we feel as if some power oppressed us, and prevented our moving our limbs. The fact is, not that the muscles will not obey the will, but that the will itself is not exercised. The paralysis and catalepsy of hysterical patients is of the same kind, and both the one and the

other immediately vanish if a strong impression be made on the senses, or even on the imagination.

Sound sleep is incompatible with voluntary exertion, mental or bodily. After long watchfulness, or severe labour, we sleep in spite of ourselves, because the power of exercising the volition is exhausted. If we would sleep under other circumstances, the first thing that we do is to abstain from exercising it. We place ourselves in that position in which we can remain without calling into action any of our voluntary muscles; we close our eyes that we may not be tempted to attend to visible objects; we exclude from our minds all disagreeable or otherwise exciting subjects to which our attention might be too earnestly directed. We cause a child to sleep by rocking him in his cradle. The so-called mesmeric passes may produce the same effect. When I do not easily fall asleep at night, I frequently succeed in obtaining sleep by watching the strange, indescribable, and ever varying spectra, which I refer to the eye, though they are pro-

bably in the brain itself, and which present themselves when real objects are excluded from the sight. It is not that on such occasions as those to which I have referred, there is absolutely no effort of attention, but the effort is so slight that it is next to none at all, and readily ceases of itself, at the same time that it prevents the greater effort which I should be led to make if things of higher interest were to occupy the mind.

There are physical causes within ourselves, and independent of all external circumstances, which interfere with sleep, — bodily pain, for example, or acid in the stomach. It may be said that actual pain, and the disagreeable sensations produced by indigestion, prevent sleep, as a strong light might prevent it, by too powerfully exciting the attention. At the same time, there is no doubt that there is sometimes a morbid condition of the nervous system, the nature of which we cannot well explain, which is incompatible with sleep. The patient says, "I feel fatigued and wearied, and that I want to sleep, but I cannot sleep."

EUBULUS. I have understood that this state of the system, when long continued, is sometimes the forerunner of mental derangement; and I can well understand it to be so. It is reasonable to suppose that the absence of its natural refreshment would powerfully affect the nervous system. Indeed, it happened to myself to be acquainted with a case of this kind. A gentleman of my acquaintance, in whose family circumstances had occurred which were to him a source of intense anxiety, passed six entire days and nights without sleep. At the end of this time he became affected with illusions of such a nature that it was necessary to place him in confinement. After some time he recovered perfectly. He had never shown any signs of mental derangement before, nor had any one of his family, and he has never since been similarly affected. This was an extreme case. But do not examples of the want of sleep producing very similar results, though in a very much less degree, occur under our observation constantly? How altered is the state of mind in any one of us after even

two sleepless nights! Many a person, who, under ordinary circumstances, is cheerful and unsuspicious, becomes not only irritable and peevish, but also labours under actual though transitory illusions; such, for example, as thinking that others neglect him, or affront him, who have not the smallest intention of doing either the one or the other.

ERGATES. I have observed such effects as these repeatedly in nurses who have been harassed by an incessant attendance on sick persons during many successive days and nights; and this goes far towards explaining the origin of a vice to which individuals of this class too frequently become addicted. Alcohol removes the uneasy feeling, and the inability of exertion, which the want of sleep occasions. I have sometimes, when I have been writing late at night, and much fatigued, so that I could scarcely fix my attention on the thing before me, feeling as if my head were almost too large for the room to contain it, obtained complete relief by taking a single glass of wine. But such relief is only temporary. Stimulants do

not create nervous power; they merely enable you, as it were, to use up that which is left, and then they leave you more in need of rest than you were before. The same observation applies to powerful mental excitement, with this difference, however, that it enables you to overcome the sense of exhaustion more completely, at the same time that it has a less transient operation than any merely physical stimulus.

CRITES. The observations which you have now offered relate chiefly to our physical condition during sleep. But the state of the mind during sleep is to us, who are not physiologists, a question of even greater interest than this. Eubulus made some remarks on this subject on a former occasion. Perhaps he can give us some further insight into it.

EUBULUS. Indeed, it is difficult for me to say anything without the risk of repeating what I have incidentally said already. Besides, I have no knowledge of the subject beyond that which is within the reach of any other person with common powers of observation.

During what may be called sound sleep, those impressions on the external senses, of which we take cognisance while we are awake, are altogether unnoticed. But it is not so with regard to those changes which are taking place in the brain itself; and that which constitutes the imagination during the day is the foundation of our dreams at night. There is, however, a great difference in the two cases, to which I adverted formerly. The imagination while we are awake is regulated by the will. We can arrest its visions as they pass before us, compare them with each other, and dismiss them as we please. But it is not so with our dreams at night. Here the visions which arise, uninfluenced by the will, succeed each other according to no rule with which we are acquainted, forming strange combinations, often wholly unlike anything that really occurs; and not less differing from reality in the rapidity with which they come and depart. You are called in the morning, and fall asleep again. Perhaps, you have slept only one or two minutes, but you have had a long dream.

The late Lord Holland was accustomed to relate the following anecdote of what had happened to himself. On an occasion, when he was much fatigued, while listening to a friend who was reading aloud, he fell asleep, and had a dream, the particulars of which it would have occupied him a quarter of an hour or longer to express in writing. After he awoke, he found that he remembered the beginning of one sentence, while he actually heard the latter part of the sentence immediately following it, so that probably the whole time during which he had slept did not occupy more than a few seconds. I mention this, however, only in the way of illustration, not as any very singular occurrence. Instances of the same thing are referred to by Lord Brougham in his "Discourse on Natural Theology;" and similar instances may, if we look for them, be found within the range of our individual experience. If we were to pursue this subject it would lead us to some curious speculation as to our estimate of time, and the difference between the real and the apparent

duration of life. The measure of time which we make by our own feelings is a very different matter from that which uncivilised man makes by the moon and stars, and which we now make by clocks and almanacks. The apparent duration of time is longer or shorter in proportion as a greater or smaller number of different states of mind follow each other in succession. To a child, whose imagination is constantly excited by new objects, and whose temper passes more easily from one passion to another, a year is a much longer period of time than to the grown-up man. As we advance in age so do the years pass more rapidly. We may suppose the life of the vivacious butterfly, which exists only for a single season, to be apparently longer than that of the slowly moving tortoise, whose existence is prolonged for one or two centuries; and that there is a similar difference, though in a less degree, between the life of the enterprising man, whose progress is crowded with events, and with alternate hopes and fears, and that of another

who, with more limited desires, keeps "the even tenour of his way."

During sleep ordinary impressions pass unnoticed. But impressions of a stronger kind rouse the attention, and in so doing put an end to sleep; while those of an intermediate kind affect us in another way, by giving a peculiar character to our dreams. Ergates made the same remark in one of our former conversations, referring to acid in the stomach, and some other cases, as illustrating the subject. It occurs to me to add another example to those which he has adduced. It lately happened to myself to dream that some one had given me a shellfish in a shell something like that of a muscle; that I ate it, and that after it had been swallowed, I felt it to be very acrid, and that it produced a pain in my throat. When I awoke I found that I laboured under a sore throat, which must have suggested the dream. It is a curious fact that we may have a long dream in the act of awaking from our sleep. A military officer informed me, that while serving in the Peninsular war he had frequently been roused from his sleep by

the firing of a cannon near his tent, and that he had a dream, including a series of events, which might be distinctly traced to the impression made on his senses by the explosion. Facts of this kind have inclined Lord Brougham to the opinion that we never dream except while in the state of transition from being asleep to being awake. But I own that this seems to me to be a mistake. First, there is no sufficient proof of it being so; and secondly, we have a proof of the contrary in the fact that nothing is more common than for persons to moan, and even talk in their sleep without awaking from it. Even in the case of a dog, who is sleeping on the rug before the fire, if you watch him, you can scarcely doubt that he is sometimes dreaming though he still remains asleep. I should myself be more inclined to doubt whether we ever sleep without some degree of dreaming. At any rate, not to dream seems to be, not the rule, but the exception to the rule: for it rarely happens that we awake without being sensible of some time having elapsed since we fell asleep; which is in itself

a proof that the mind has not been wholly unoccupied. That on such occasions we have no distinct recollection of our dreams proves nothing. Referring again to the instance of persons who talk in their sleep, we often find that they have not the smallest recollection of their having dreamed afterwards. It is only those dreams which affect us very strongly, and which occur immediately before we awake from sleep, that we really remember; and even of these the impression is not in general sufficient for us to retain it for more than a very few minutes. If a dream be remembered longer, it is only because we have thought of it after it occurred, and have thus given it a place in our memory which it could not have obtained otherwise. And this leads me to observe that, although memory does so little as to dreams, dreams throw some light on this wondrous faculty. I know not indeed what has happened to others, but it certainly has often happened to myself to dream of something that had occurred in my boyish days, and of which, as it had not been present to my

thoughts for many years, it might well be supposed that it was wholly forgotten. On one occasion, I imagined that I was a boy again, and that I was repeating to another boy a tale with which I had been familiar at that period of my life, though I had never read it, nor thought of it since. I awoke, and repeated it to myself at the time, as I believe accurately enough, but on the following day I had forgotten it again. We may conclude from this and from some other analogous facts, that many things which seem to be erased from our memory are not erased from it in reality; that the impression remains, and that if we are not conscious of it, it is merely because the secret spring has not been touched, which would bring it again under our observation.

CRITES. What you have now mentioned shows that, however capricious and irregular during sleep the imagination may be, there are exceptions to the general rule. I have heard of mathematicians who have solved problems, and of others who have composed poetry in their sleep. An acquaintance of mine, a soli-

citor, was perplexed as to the legal management of a case which concerned one of his clients. In a dream he imagined a method of proceeding which had not occurred to him when he was awake, and which he afterwards adopted with success.

EUBULUS. I may refer to some analogous instances which have come within my own knowledge. A friend of mine, a distinguished chemist and natural philosopher, has assured me that he has more than once contrived an apparatus for an experiment which he proposed to make, in a dream; and another friend, who combines mathematical with all sorts of knowledge besides, has solved problems in his sleep, which had puzzled him when awake. But these things are rare exceptions to the general rule. They do not, as it seems to me, at all controvert the opinion that the essential character of sleep is the suspension of volition; and, on this hypothesis, they are easily explained. There are, as Ergates has observed, degrees of sleep; and in a dream which occurs between sleeping and waking, the power of attention may be exercised,

though not to the same extent as when we are completely awake. Besides this, however, it would indeed be a strange thing, in the crowded chapter of accidents, if among the vast number of combinations which constitute our dreams, there were not every now and then some having the semblance of reality. Further, I suspect that in many of the stories of wonderful discoveries made in dreams, there is much of either mistake or exaggeration; and that if they could have been written down at the time, they would have been found to be worth little or nothing. Knowing how imaginative a person Coleridge at all times was, I may, I hope, be excused for saying that it is more easy to believe that he imagined himself to have composed his poem of Kuhla Khan in his sleep, than that he did so in reality. I may here refer to the experience of a distinguished physiologist on this subject. "Sometimes," says Müller, "we reason more or less accurately in our dreams. We reflect on problems, and rejoice in their solution. But on awaking from such dreams the seeming

reasoning is found to be no reasoning at all, and the solution over which we had rejoiced to be mere nonsense. Sometimes we dream that another proposes an enigma, that we cannot solve it, and that others are equally incapable of doing so, but that the person who proposed it himself gives the explanation. We are astonished at the solution, which we had so long endeavoured to find. If we do not immediately awake, and afterwards reflect on this proposition of an enigma in our dream, and on its apparent solution, we think it wonderful; but if we awake immediately after the dream, and are able to compare the answer with the question, we find that it was mere nonsense. I have at least several times observed this in my own case."*

ERGATES. Still, without referring to such exercises of the intellect as Müller has described in the passage which you have now quoted, it must be owned that there is often a remarkable degree of coherence in our dreams. A drama is performed, including a series of

* Müller's Physiology, translated by Baly, p. 1417.

events in which we ourselves are concerned, and having a mutual relation to each other. There are other actors in it, who seem to speak and act independently of ourselves, as if influenced by other motives, and aiming at other objects, with regard to which we do not concur, or to which we may be actually opposed. Scenes are presented to us, in which it seems that an intelligence is exercised, although we do not understand how that intelligence can be our own. How is it that these things happen? I own that I search in vain for any very satisfactory explanation.

EUBULUS. Another question arises as to dreams, which it is even more difficult to answer than that which you have suggested. Are they merely incidental effects of the existing order of things, as determined by the will of the Creator of the universe; or do they answer any special purpose, and lead to any ulterior consequences? In a machine of human invention effects arise which are truly incidental, that is, which were never contemplated or intended by the inventor. For instance, it was

casually discovered that an abundance of electricity may be obtained from the steam supplied by the boiler of a steam-engine. But such a result had never been anticipated by those to whom we are indebted for this great invention. Does anything like this happen with regard to the machinery of the universe? Is it not more probable that everything that occurs has been anticipated, and has its definite and appointed purpose? I believe that no one has hitherto offered any certain or satisfactory explanation of the uses of the spleen, and that it is known that animals may live, and apparently in good health, after that organ has been removed. So, also, no satisfactory explanation has yet been offered of the functions of the thyroid gland or the renal capsules. Yet no one believes the formation of these organs to be merely incidental, or doubts that they have some special offices allotted to them. Dreams are, at any rate, an exercise of the imagination, and one effect of them may be to increase the activity of that important faculty during our waking hours. As they are influenced by our pre-

vailing inclinations, so they may help us to form a right estimate of our own characters; and assuredly it would be presumptuous to say that they may not answer some still further purpose in the economy of percipient and thinking beings.

CRITES. Before our conversation for this day is concluded, there is one other inquiry which I would make of Ergates. Believing, as I do, that the percipient, conscious, and intelligent mind belongs to a mode of existence wholly different from that of the senseless bodies by which we are surrounded, still I cannot but admit that there must be certain changes taking place in the nervous system in connection with mental processes, some of these being transient in their nature, while others are so far permanent that they may not be effaced during the longest life. Now, with regard to these changes, Ergates has stated that "their exact nature is a mystery which we have no means of unravelling, and that this is a kind of knowledge as much beyond our reach as that of the structure of the sun, or of the central parts

of the earth." Not disputing the correctness of this statement, yet I see no reason why we might not be able to form some general notion on the subject, and the following questions naturally present themselves to us. Are the changes which the nervous system undergoes simply mechanical? or are they of the same kind as those chemical changes which take place in inorganic matter? or do they rather belong to that class of phenomena which we refer to imponderable agents, such as electricity and magnetism, by virtue of which a piece of sealing-wax rubbed with a silk handkerchief draws light bodies to itself, or a bar of iron becomes endued with the attractive property of a magnet?

ERGATES. Although these subjects have not been hitherto formally discussed, still you may on some points anticipate my answer from observations which I have already made incidentally.

The very little that we actually know may be comprised in a few words.

1. The transmission of impressions from one

part of the nervous system to another, or from the nervous system to the muscular and glandular structures, has a nearer resemblance to the effects produced by the imponderable agents to which you have alluded than to anything else. It seems very probable indeed, that the nervous force is some modification of that force, which produces the phenomena of electricity and magnetism; and you may recollect that I have already ventured to compare the generation of it by the action of the oxygenised blood on the gray substance of the brain and spinal chord, to the production of the electric force by the action of the acid solution on the metallic plates in the cells of a voltaic battery.

2. We know that the solid parts of the body are in a state of perpetual change. There is a constant influx of new materials supplied by the digestive organs, and in other ways; and a corresponding efflux of the old materials by means of the various excretions, especially by that of the kidneys. The brain itself forms no exception to the general rule. We cannot

otherwise account for its growth in the early part of life, nor for the alterations in its structure which arise as the consequence of disease, nor for those other changes which occur in extreme old age. The molecules of the brain in a man of twenty years of age are not the same with those which formed the brain of the same individual when he was ten years old, nor with those of which it will be composed when he arrives at the age of fifty years. The mind preserves its identity, but there is no corresponding identity of the corporeal organ with which it is associated; and we may even venture to assert that the brain of to-day is not precisely and in all respects the same with the brain of yesterday, and that it will not be the brain of to-morrow.

3. We cannot suppose that such deposition of new materials and abstraction of old ones can be effected by mere mechanical means, as you would take one brick from a building and substitute another in its place. The elements of which the nervous system is composed exist in the blood, but they must undergo a new

chemical combination before they can be incorporated with it; and in like manner they must undergo a chemical change of an opposite kind before they can re-enter the current of the circulation. The precise character of these chemical changes we have no means of ascertaining, but whatever it may be, there is reason to believe that in proportion as the nervous system is more or less exercised, whether it be in connection with mere corporeal functions, or with mental processes, so do they take place to a greater or less extent. As relating to this subject it may be observed that the nervous substance is distinguished from all the other tissues (with the exception of the bones) by the very large proportion of phosphorus which enters into its composition, amounting to 1·5 parts in 100, and to as much as one-thirteenth of the solid matter which remains after the evaporation of the water; and that one result of over-exercise of the nervous system is the elimination of an unusual quantity of salts containing phosphorus by means of the secretion of the kidneys. This fact was first observed by

Dr. Prout, who has given it as his opinion "that the phosphorus in organized beings is in some measure connected with nervous tissues and nervous action," and who in another place refers to "severe and protracted debilitating passions, and excessive fatigue, as the general exciting causes of" what he terms the "phosphatic diathesis."*

4. With regard to those more permanent changes in the brain to which Crites has referred as connected with the memory, and what is called the association of ideas, and I may add, with our mental habits and dispositions as far as these are dependent on physical organization, I have nothing to offer beyond what I have expressed already. There is, I apprehend, sufficient evidence that such changes do certainly take place, but as to their real nature we not only know nothing, but have no means of obtaining any actual knowledge. The improved microscopes of the present day have enabled us to unravel to a considerable extent the minuter tissues of the animal body;

* On the Stomach and Renal Diseases, third edition.

but nevertheless, in an inquiry such as this, they afford us no assistance. There can be no doubt that there is as much in the animal structures beyond the reach of the microscope, as there is in the vast universe around us beyond the reach of the telescope; so that, whatever we might thus discover, we may be sure that there is something further still. But let us suppose that it were otherwise, and (assuming the molecular hypothesis to be true) that with more perfect organs of sense, or more perfect instruments, we could trace exactly the changes which take place in the arrangement or aggregation of the ultimate molecules of the brain, I do not see that we should be much advanced in knowledge. We should be just as far from identifying physical and mental phenomena with each other as we are at present. The link between them would still be wanting, and it would be as idle to speculate on the nature of the relation between mind and matter, as on the proximate cause of gravitation, or of magnetic attraction and repulsion.

THE FIFTH DIALOGUE.

Mental Faculties of Animals. — Their Relation to the Structure of the Brain. — Difficulty of the Inquiry, but some knowledge of it not beyond our Reach. — Cerebral Organs connected with the Animal Appetites and Instincts. — Organs subservient to the Intellect. — Question as to the Uses of the Cerebral Convolutions. — The Posterior Lobes of the Cerebrum. — The Corpus Callosum. — The Development of the Mental Faculties, how far dependent on the Perfection of the Senses, and other external Circumstances. — The Nature and Office of Instinct. — Intelligence not peculiar to Man, nor Instinct to the lower Animals. — Human Instincts. — The Social Instinct and the Moral Sense. — Some Instincts as necessary to Animal Existence as the Circulation of the Blood, and other mere Animal Functions. — Acquired Instincts transmitted from Parents to Offspring. — These considered with reference to Moral and Political Science. — The Social Instinct viewed as correcting or modifying other Instincts, and as being made more efficient by the greater Development of the Intellect. — The Religious Instinct. — Primary Truths of Buffier and Reid.

It was one or two days after the conversation which has been just recorded, that we found ourselves in the afternoon on the side of

a hill on which some sheep were scattered, watching the operations of the sheep-dog, who was collecting the flock previously to their being driven home for the night. This led to a conversation respecting the habits and faculties of animals; and Eubulus gave us the history of a dog who, having been taken in a carriage, and by a circuitous route, to a distant place, nevertheless, some time afterwards, found his way back to his former home, having, as it appeared, gone across a tract of country with which he could have had no previous acquaintance.

ERGATES. There are very many well-authenticated instances of the same thing. It is even said that dogs carried across the sea have travelled back to their former place of abode, having established themselves on board ship for that purpose. Nor is this faculty peculiar to dogs. At least I have read an account of herds of cattle in New South Wales which, having been removed from their accustomed haunts to new pastures at a considerable distance, have nevertheless

returned, not by the road which they had gone before, but by going straight across the country, through wilds which they had never traversed previously.

EUBULUS. There are few subjects of inquiry more interesting to man than that of the moral and intellectual qualities of other animals, yet there are few of which we know so little. There are, it is true, a good many scattered observations relating to it; and I may especially refer to the very interesting collection of facts which are recorded in one of Lord Brougham's dialogues.* No one, however, has devoted himself to such inquiries in the same way as many have done to other departments of knowledge. The papers of Frederic Cuvier are truly scientific, and contain much important matter, but they relate to a very limited number of animals. He began the study too late, and died too early, to make any considerable progress in it. Such an investigation is, indeed, attended with peculiar difficulties, and to pursue it with

* Dissertations on Subjects connected with Natural Philosophy, by Henry Lord Brougham, vol. i. dial. 3.

advantage would afford ample occupation, even with the largest opportunities, for the entire term of a man's life.

ERGATES. It may be, as I observed on a former occasion, that some of those beings which are usually regarded as the very lowest form of animal life, have no endowments superior to those which belong to vegetables. Setting these aside, however, I apprehend that no one who considers the subject can doubt that the mental principle in animals is of the same essence as that of human beings; so that even in the humbler classes we may trace the rudiments of those faculties, to which in their state of more complete development we are indebted for the grandest results of human genius. We cannot suppose the existence of mere sensation without supposing that there is something more. In the stupid carp which comes to a certain spot, at a certain hour, or on a certain signal, to be fed, we recognise at any rate the existence of memory and the association of ideas. But we recognise much more than this in the dog who assists the

shepherd in collecting his sheep in the wilds of the Welsh mountains. Locke and Dugald Stewart following him, do not allow that "brute animals have the power of abstraction." Now taking it for granted that abstraction can mean nothing more than the power of comparing our conceptions with reference to certain points to the exclusion of others; as, for example, when we consider colour without reference to figure, or figure without reference to colour; then I do not see how we can deny the existence of this faculty in other animals any more than in man himself. In this sense of the word, abstraction is a necessary part of the process of reasoning, which Locke defines as being "the perception of the agreement or disagreement of our ideas." But who can doubt that a dog reasons, while he is looking for his master, whom he has lost; or (as in the instance of which we were speaking just now) when he is seeking his way home over an unknown country?

CRITES. But if my recollection be accurate, Dugald Stewart does not mean to deny

that brute animals are capable of the simpler forms of reasoning. He merely states that being unable to carry on processes of thought by the help of artificial signs (that is, of language), they have no power of arriving at general or scientific conclusions.*

ERGATES. Without doubting for an instant the vast superiority of the human mind, still it appears to me to be difficult to say how far the capacities of brute animals are limited in these respects. It is not to be denied that the aid of language is necessary to the carrying on any long, or complex, process of reasoning. But we see, nevertheless, that those who are born deaf and dumb reason to a great extent; and, on the other hand, it may well be questioned whether some animals are so wholly unprovided with language as Dugald Stewart supposes.

EUBULUS. I am inclined to believe, with Ergates, that the minds of the inferior animals are essentially of the same nature with that of

* Moral Philosophy, vol. iii. p. 393. edit. 1827.

the human race, and that of those various and ever-changing conditions of it, which we term the mental faculties, there are none of which we may not discover traces more or less distinct in other creatures. Still, in the degree in which these faculties exist, there is a vast difference, not only between what they are in man and in other animals, but in other animals among themselves. And this leads us to another subject, on which I shall be glad if Ergates can give us some information.

It being admitted that the brain is the material organ in connection with the mental principle; and it being also admitted that there is in the different species of animals, on the one hand, a great difference as to the extent of their moral and intellectual faculties, and on the other hand, a not less remarkable difference in the size and formation of the brain; we cannot well avoid the conclusion that these two orders of facts are, in a greater or less degree, connected with each other. I do not mean to infer from this connection that the

mind is always the same, and that the greater or less development of it depends altogether on the greater or less perfection of the material organ. It may well be supposed that the original difference is in the mind itself, and that the Creator has so ordained that the brain in the different species of animals should be such as will meet the requirements of the peculiar mind with which it is associated: — a view of the subject, which, if I am not misinformed, derives no small support from the researches of modern physiologists. I understand that the embryos of all the vertebrate animals have in the first instance so nearly the same character, that they cannot be distinguished from each other: that starting, as it were, from one common point, the changes which the embryo undergoes differ, not only in different classes, but in different genera and species, as if something were superadded to the physical organization, by which those changes are regulated, and differently directed, thus giving origin to that immense variety of forms of animal life, which we see everywhere

around us. However that may be (and I admit that it is idle, if not presumptuous, to speculate on a subject, as to which we are so entirely without the means of obtaining any actual knowledge), it does not at all affect the question as to the relation which exists between the organization of the brain and the mental faculties. What I wish to know is, how far does our knowledge of this relation really extend? Is it possible, from any experience that we have of the habits and character of a particular tribe of animals, to predicate what kind of brain we should find them to have on dissection, or from our observations on the latter, to form an opinion as to their moral and intellectual capacities?

ERGATES. To a limited extent this knowledge is within our reach. If two brains were placed before me, in one of which the cerebral hemispheres were largely developed, while in the other they were very little developed, or altogether absent, I should at once pronounce the former to indicate the existence of a much greater intelligence than the latter.

But I see no reason to doubt that we might learn more than this; and that an individual, who, in addition to ample opportunities of examining the brains of different animals by dissection, had equal opportunities of studying the habits and behaviour of the same animals while alive, and who himself possessed the necessary qualities for such investigations, might, in the course of time, and after some years of thought and labour, arrive at some very interesting and satisfactory results. If, hitherto, so little progress has been made in this department of knowledge, that is easily accounted for. The combination of opportunities which I have suggested, is of very rare occurrence, and, when it does occur, few persons are qualified to take proper advantage of it. It is, indeed, very far from being a matter of course that the anatomist, who has successfully pursued his own plain matter-of-fact science, should be the one best fitted for observing and comparing the fleeting phenomena of the mind, the study of which, presented as they are to us only through the

medium of their external manifestations, must be proportionally more difficult as they differ from the only standard of comparison which we possess in our individual selves.

EUBULUS. You might have mentioned another difficulty, — that we seldom see other animals in their free and natural state, or otherwise than as being cowed and oppressed by the superiority of man. I suspect that, from this cause, we are led to under-estimate, on the whole, the moral and intellectual qualities of inferior creatures. How little should we know of man himself if we studied him only among the slaves of a Virginia planter! The rook confined in a cage would afford us but little information as to what the rook may be in the republic of his native rookery. The horse tied to his manger in our stables is a very different animal from the horse which is domesticated in his master's family in the Arab's tent; and he must be still more different from him who wanders over the prairies of America under the dominion of his chief. Even if we could live in a colony of rooks, or

in a herd of wild horses, not having the means of communicating with them, such as these animals certainly have among themselves, how difficult would it be for us to obtain any real knowledge as to their moral and intellectual condition! How little should we know even of our own species in this respect, if we had not the power of mutually communicating our desires and thoughts through the medium of oral and written language!

ERGATES. You will not then be surprised to learn how little has been done towards connecting physical organization and mental phenomena with each other. The observations of Magendie, Flourens, and some other physiologists, however interesting they may be, throw no light on the more difficult and recondite subject, which we are now discussing. There is, indeed, only one fact connected with it which can be considered as well established. Those bodies, situated in the base of the brain, to which in the human subject we give the names of *medulla oblongata*, *cerebellum*, *thalami*, *corpora striata*, and *tubercula quadrigemina*,

and the parts corresponding to these in other vertebrate animals, are connected with that class of phenomena which belongs to the animal appetites and instincts; and the two larger masses, which are placed above them, and are known as the cerebral hemispheres, are more especially subservient to the higher faculties belonging to the intellect. The proof of what I have now stated is that in the lower classes of vertebrate animals, in whom the appetites and instincts predominate over the intellect, the first-mentioned bodies form almost the entire brain, and that, very much as the intellect is more developed, so are the cerebral hemispheres more developed also; the degree of their development being more remarkable in man than in any other animal.* Some apparent exceptions to this rule are easily explained. In birds, which are so much more than man, or than quadrupeds, under the dominion of instinct, the cerebral hemispheres appear at first sight to be of great size in proportion to the rest of the brain. But you may

* See Additional Note F.

recollect that on a former occasion, I explained that they are not so in reality, and that the only part, which can properly be compared with the hemispheres, is a layer of cerebral substance laid on the surface of two other bodies (the *corpora striata*), these being of an enormous size. Again, in some of the cetaceous, and in one or two of the quadrumanous animals, the cerebral hemispheres are so large in proportion to the rest of the body as to approach very nearly to what they are in man himself. But their size is only one of the things to be taken into the account. Although a steam-engine of great power must be of certain dimensions, much will depend on its peculiar construction. So it probably is with regard to the cerebral hemispheres. They consist of two parts, the white, medullary or fibrous substance, which forms the greater portion of their bulk, and the more vascular gray substance, which is expanded on their surface. I stated formerly that the latter is supposed to be the part in which the nervous force is generated; and, therefore, the most

important of the two structures. The surface of the hemispheres is formed into folds, or convolutions, and as the fissures by which these are separated are deeper and more numerous, so does the gray bear a larger proportion to the medullary substance. In animals of a very low degree of intelligence, in the kangaroo for example, the convolutions are almost entirely wanting. In man they are more remarkable as to number and depth than in any other animal, and hence some very eminent physiologists, not without some show of reason, have been led to believe that it is by his organization in this respect that he is adapted to the exercise of that high degree of intelligence which places him at so vast a distance above the rest of the animal creation.*

Whether this hypothesis be or be not well-founded, it is to be observed that it is not merely as to its greater volume, and the greater extent of the convolutions of the cerebrum, that the brain of man differs from

* See Additional Note G.

that of other animals. Comparing it with the brains of the other mammalia (and it is only with these that it much admits of comparison in reality), we find that the posterior lobes of the cerebrum are almost peculiar to the human race. The only other animals in which they exist are those of the tribe of monkeys, and in them they are of a much smaller size than they are in man. The absence of this part of the brain includes the absence of what seems to be a special organ situated in the posterior elongation of the lateral ventricle, known by anatomists under the name of the *hippocampus minor;* and it is worthy of notice, that even in monkeys, who are not altogether without the posterior lobes, this organ is wanting. The *corpus callosum* is the name given to a broad thick band of nervous fibres which unites the two cerebral hemispheres, as if for the purpose of bringing them into harmonious action with each other. In the kangaroo, which I have already mentioned as having a very low degree of intelligence, the *corpus callosum* is altogether wanting. This

fact of itself might lead us to conjecture that some important office is allotted to it; and the opinion is confirmed by observations made on the human subject. Cases are on record in which, from an original malformation, this organ was wanting either wholly or in part. In none of them could it be said that the intellectual faculties were altogether deficient. But in all of them there was an incapability of learning, producing an apparent dulness of the intellect, so that the individuals were unfit for all but the most simple duties of life.*

Eubulus. I grant that you have sufficiently established the proposition with which you set out. At the same time it would seem that the organization of the brain does not indicate the actual extent to which the mental faculties are exercised, nor anything more than the capability of exercising them. Having certain original endowments, which differ in different individuals, the mind is made what it is by the force of external circumstances. How different

* See Mr. Paget's and Mr. Henry's observations in the Medico-Chirurgical Transactions, vols. xxix. and xxxi.

was that of the savage of Aveyron from what it might have been if he had been trained to early habits of obedience and self-denial, and had been taught to make use of those powers of attention and reflection which God has conferred to a greater or less extent on all of us, but which run to waste if neglected. It is by no means impossible that in some nation of savages there may be an individual with such natural endowments, that, if placed under exactly similar circumstances, he might have become another Newton; and we may be assured that Newton would have been quite different from what he proved to be, if he had been born and bred among the aborigines of Australia. The external circumstances on which the mind more immediately depends are the organs of sense, as it is through them that all knowledge is originally derived, and as without them it would have none of the materials of thought. The mind of an individual who labours under congenital blindness, or congenital deafness, cannot fail to be imperfect as compared with that of others, except where great pains are

bestowed on the application of those means which science has furnished for supplying the deficiency; and the imperfection must be greater still in those instances in which these two calamities are unhappily combined.

ERGATES. You may extend your observations to other animals, and add, that as among them there is a considerable difference as to the structure and relative value of the organs of sense, so this must be taken into the account if we would form even a rough estimate (and we can form no other) of their mental condition. In birds the eye is a more complicated, and evidently a more perfect, organ than it is in our own species, or in the mammalia generally. The eye of an eagle is nearly as large as that of an elephant; he has a wider range of vision, and can distinguish objects at a distance at which they would be to us altogether imperceptible. In this respect he has means of obtaining knowledge which man does not possess, and so far has an advantage over us. Having the power of ascending to the higher regions of the atmosphere, it is plain that the external world

must be presented to him under a very different aspect from that under which it is presented to ourselves. But this is no solitary instance. There are many other animals which have organs of sense more perfect, and many others which have them less perfect, than they are in the human race; and whatever that difference may be, it must lead to a like result by modifying their perceptions, and, if I may be allowed the expression, their notions, of things external to themselves.

EUBULUS. We cannot suppose it to be otherwise. The astronomer who contemplates the planets and the Milky Way, and discovers revolving stars and remote nebulæ by means of the telescope, may be regarded, as far as the heavenly bodies are concerned, as being endowe with another sense, so that the impressions which they produce on his mind must be quite different from those which they produce on the mind of the peasant, who knows nothing of them beyond that which is disclosed to his unassisted vision. But how much greater difference would there be if his eye were so con-

structed that, without the aid of glasses, it answered the purpose of a telescope for distant objects, and of a microscope for others!

Ergates. The dog distinguishes external objects from each other less by his sense of sight than by his sense of smell, of which last we ourselves make comparatively little use. The whiskers of a cat, each having a special nerve belonging to it, form a much more delicate organ of touch than the human fingers. There is reason to believe that some insects are enabled to take cognisanee of the electric state of the atmosphere, as we take cognisance of heat and cold. The eyes of insects are very different from the eyes of the higher classes of animals, eonsisting sometimes of as many as a thousand hexagonal and transparent plates arranged, not in the same plane, but at angles to each other, so as to form altogether a large portion of a sphere, eaeh having belonging to it what seems to be its own peculiar retina. With eyes such as these the vision of insects must be very different from ours, having an enormous range, with no such distinet pieture as is formed on the hu-

man retina, and probably affording its possessor less perfect means of distinguishing near and distant objects from each other. On the other hand, the mole has an imperfect eye, and the *mus typhlus*, or subterraneous rat, the *proteus*, and the *siren*, are altogether deprived of the sense of sight. It is plain that the relations of these animals to the external world, and their conceptions of objects external to themselves, must differ according to the difference in their respective faculties of sense.

Still, as Frederic Cuvier justly observes, "we must not, therefore, exaggerate the influence of the organs of sense on the mental functions; nor can we admit the doctrine which some authors have held, that the perfection of the intellect depends very much on the greater or less perfection of these physical organs."* This is, indeed, clearly an hypothesis unsupported by facts. The eye and ear of the seal are so constructed that he must have very moderate powers of sight and hearing, and,

* Annales du Muséum d'Histoire Naturelle, tome xvi. p. 54.

except through the medium of his whiskers, it may be said that he has no sense of touch at all. Nevertheless, the philosopher whom I have just named, who had ample opportunities of studying the habits of the seals in the *Jardin des Plantes*, describes them as being possessed of intelligence above the average of that which belongs even to the higher classes of the mammalia.*

EUBULUS. The remarks which you have just now made are equally applicable to the hypothesis which some one has advanced, that man is made what he is by the possession of the hand, as a more perfect organ of prehension peculiar to himself; and thus we fall back on your original proposition, that, as far as his physical organization is concerned, it is in that of the brain alone that we are to look for the evidence of his superiority to other creatures.

CRITES. I may now venture to make an observation, which I should have made before, if I had not been unwilling to interrupt the conversation. When you speak of instinct, as

* Annales du Muséum d'Histoire Naturelle, tome xvii. p. 397.

contradistinguished to the higher faculties of the intellect, I conclude that you refer to it as a principle by which animals are induced, independently of experience and reasoning, to the performance of certain voluntary acts, which are necessary to their preservation as individuals, or the continuance of the species, or in some other way convenient to them. Now I would ask if it be quite clear that this distinction is well founded? Has it not been the opinion of some physiologists that by a careful analysis of what are called instinctive actions, they may be traced to the operation of experience, quite as much as those which are more palpably derived from this source?

ERGATES. You may refer especially to the first Dr. Darwin, whose great, but too discursive genius, was apt to travel too fast for the cautious pursuits of science. Let me state a few facts, and then leave you to judge for yourself.

Food is required because life cannot be maintained without it. But no one under ordinary circumstances thinks of this ultimate

object. We have an uneasy sensation which we call hunger, and it is merely to remove this sensation that we are led to eat. This is the simplest form of instinct, and it goes far towards explaining others which are more complicated. The desire for food is the same in the newly-born child as in the grown-up man; and when applied to his mother's breast he knows at once how to obtain it by bringing several pairs of muscles of his mouth and throat successively into action, making the process of suction. The newly-born calf needs no instruction to enable him to balance himself on his four legs, to walk, and seek the food with which he is supplied by his mother. The duckling hatched by the hen, as soon as his muscular powers are sufficiently developed, is impelled by the desire to enter the neighbouring pond, and, when in the water, without example or instruction, he calls certain muscles into action, and is enabled to swim. When a sow is delivered of a litter, each young pig as it is born runs at once to take possession of one of his mother's nipples, which he considers as his peculiar property

ever afterwards. So the bee prepares his honey-comb, and the wasp his paper nest, independently of all experience or instruction. It is worth your while to refer to the luminous exposition which Lord Brougham has given of the mathematical accuracy with which the former does his work. Yet I do not see that it is at all more marvellous than what we see in the young calf. It would require a profound knowledge of mechanics, and a long investigation, to determine beforehand what muscles should be called into action, and in what order they should act, to enable him to balance himself on his feet, to stand and walk. Yet all this he accomplishes at once, as if it were a mere matter of course. I do not see how these and a thousand other things can be explained on the hypothesis of Darwin, or otherwise than by supposing that certain feelings exist which lead to the voluntary exercise of certain muscles, and to the performance of certain acts, without any reference at the time to the ultimate object for which these acts are required.

EUBULUS. It would seem that it is in the

proportion which their instincts and intelligence bear to each other that the difference between the mind of man and that of other animals chiefly consists. Reasoning is not peculiar to the former, nor is instinct peculiar to the latter. Even as regards insects, which are generally, and properly, regarded as being below the vertebrate animals in the scale of existence, and whose nervous system is of so simple a structure as to admit of no comparison with that of the human subject, we cannot well hesitate to believe that they are not altogether deprived of that higher faculty which enables ourselves to apply the results of our experience to the new circumstances under which we are placed.

"Esse apibus partem divinæ mentis"

is no mere fiction of poetry. It is by instinct that the bee collects his honey, and constructs the hexagonal cells of his honey-comb (always according to the same pattern) from the wax furnished for that purpose by his own secretions. But instinct will not account for all

that he does besides. When a swarm is transferred to a new hive placed among many others, at first they are found frequently mistaking other hives for their own, and it is only by experience that they are taught after some time to distinguish the particular hive in which their queen is lodged.* Their habit is to build their honey-comb from above downwards, attaching it to the upper part of the hive. On one occasion when a large portion of the honey-comb had been broken off, they pursued another course. The fragment had somehow become fixed in the middle of the hive, and the bees immediately began to erect a new structure of comb on the floor, so placed as to form a pillar supporting the fragment and preventing its further descent. They then filled up the space above, joining the comb which had become detached to that from which it had been separated, and they concluded their labours by removing the newly-constructed comb below; thus prov-

* Principles of Physiology, by W. Carpenter, M.D. Second edition, p. 224.

ing that they had intended it to answer a merely temporary purpose. I state this on the authority of a gentleman whose attention has been much directed to these and similar inquiries.

The observations of M. Dujardin place it beyond a doubt that bees have some means of communicating with each other, answering the purpose of speech. When a saucer containing syrup was placed in a recess in a wall, and a bee conveyed to it on the end of a stick which had been also smeared with syrup, he remained there for five or six minutes, and then flew back to his hive. In about a quarter of an hour thirty other bees issued from the same hive, and came to regale themselves on the contents of the saucer. The bees from the same hive continued their visits as long as the sugar remained in the state of syrup and fit for their purpose, but none came from another hive in the neighbourhood. When the sugar was dry, the saucer was deserted, except that every now and then a straggler came, as if to inspect it, and if he found that by the addition of water it was

again in a state of syrup, his visit was presently followed by that of numerous others.*

If even a portion of the observations made by the younger Huber on ants be well founded, these little creatures must be regarded as possessing, in addition to their instincts, no small portion of intelligence. It is observed by a modern writer that "there is hardly a mechanical pursuit in which insects do not excel. They are excellent weavers, house-builders, architects. They make diving-bells, bore galleries, raise vaults, construct bridges. They line their houses with tapestry, clean them, ventilate them, and close them with admirably fitted swing-doors. They build and store warehouses, construct traps in the greatest variety, hunt skilfully, rob and plunder. They poison, sabre, and strangle their enemies. They have social laws, a common language, division of labour, and gradations of rank. They maintain armies, go to war, send out scouts, appoint sentinels, carry off prisoners, keep slaves, and tend do-

* Annales des Sciences Naturelles, tome xviii. p. 233.

mestic animals. In short, they are a miniature copy of man rather than that of the inferior vertebrata."* Of these things which have been thus graphically described, much may indeed be referred to the operation of instincts, or to what Dr. Carpenter terms "unconscious cerebration;" but surely it involves a considerable *petitio principii* not to refer a part of them to a higher principle, bearing a resemblance, however remote, to human intelligence.

It would be easy to extend observations such as these to other parts of the animal creation. We see, among the mammalia and birds, even those which are the least intelligent nevertheless availing themselves of the lessons of experience, and adapting their proceedings to the new circumstances under which they are placed; while with respect to the gregarious animals, it is plain that their association could not be maintained unless they had certain rules of conduct among themselves, and the power of communicating their wants and feelings to each

* British and Foreign Medical Review, No. 23. p. 10.

other by some kind of language, however imperfect it may be. On the other hand, man, gifted as he is with such (comparatively) vast capacity of memory and reflection — with such powers of observation; having the gift, not merely of language, but of articulate speech, and the use of words — "those shadows of the soul, those living sounds, which render the mere clown an artist — nations immortal — orators, poets, philosophers, divine!" * — by means of which he lays up stores of knowledge, not only for himself and for those now in existence, but also for generations which are to come; living not merely in the present time, but also in the past, and even in the future; whose aspirations lead him to inquiries of a higher nature, beyond the visible and tangible world in which he is placed; — even man, such as he is, is in many respects the creature of instincts; and what would he be without them? As Ergates has already remarked, when he seeks

* The Philosophy of Language, comprehending universal grammar, by Sir John Stoddart, LL.D., second edition, p. 1. See Additional Note II.

food it is at the moment, not because his reason and experience tell him that he would die without it, but because he is impelled to do so by the uneasy sensations which the want of it occasions. So also is thirst an instinct. The child is attracted to the mother's breast by instinct. The love of the parent for the child, and the desire to avoid danger and prolong life, are instincts also.

Man could not exist as a solitary being. He has neither swiftness of feet, nor any natural means of offence and defence, which would enable him to compete with the buffalo, the lion, or the wolf. It would have been of little avail to him if the Creator had left it to himself to learn by hard experience, and any wisdom of his own, that he can procure his own safety, and his means of subsistence, only by associating with others. The desire to live in society is as much an instinct in him as it is in the bee, or the ant, or the beaver, or the prairie dog. Ought not this to settle the disputed question as to the existence of a moral sense? For how could mankind live in society,

helping and protecting each other, and joining in common pursuits, if they were not so constructed as to sympathize with each other in their joys and sorrows, and if they did not feel individually that they owe to others what they expect others to offer them in return. Experience and reason, and, if you please, self-interest, tend to confirm, to refine, to exalt these sentiments, but they do not create them. The child is led to seek the society of other children by an impulse which he cannot resist, and which is independent of any intellectual operation. But having done so, his moral qualities, which would otherwise have remained in abeyance, are gradually developed, and (except there be some actual imperfection of the mental faculties) the power of distinguishing right from wrong, justice from injustice, follows, as a matter of necessity, the result of an innate principle, and not of anything acquired.

CRITES. All that you have now stated leads to this conclusion, that although it is only as to the higher faculties of the mind that mankind *propius accedunt ad Deos;* that it is only as to

these that the Deity has created man in his own image; it is not less true that as to mere animal existence these are of much less importance than the lower faculties of instinct. If the Deity had no other intention than that of maintaining on the surface of the globe a large number of living beings susceptible of enjoyment and indulging in sensual gratifications, with a very small proportion of painful feelings, such intention would have been sufficiently carried out by the creation of animals endowed with imperfect memory, with no capability of experience, with no thought as to the future, and acting solely under the direction of instinct. That the scheme of creation is not thus limited, and that it tends to some ulterior and grander object, we may well conclude from the existence of that principle of intelligence, the dawning of which we observe in the lower animals, and which we find more completely developed in the human race.

EUBULUS. It seems, indeed, to be as you have stated, that animals may, and that some animals probably do, exist by means of instinct

alone, and without possessing any of the superior intellectual faculties. The converse of this proposition, however, does not hold good, and it is plain that the latter would be quite insufficient unless they were accompanied by instinct. Without it, experience and the anticipation of what is to come, founded on the recollection of the past, would be the only guide, and these of course could not belong to the newly-created or newly-born animal. Indeed, we cannot but suppose that when man first began to exist, and for some generations afterwards, the range of his instincts must have been much more extensive than it is at the present time. We see the infant first deriving nourishment from his mother's breast, but when the period of lactation is over, the experience of his parents supplies him with the fit kind of food derived from other sources. The absence of such experience must, in the first instance, have been supplied by a faculty which he does not now possess (but which we see manifested in the lower animals), directing him to seek that which is nutritious, and to avoid that which is

not so, or which is actually poisonous. It is easy to conceive that much besides in the habits and actions of human beings which seem now to be the results of experience and imitation, was originally derived from instinct; and indeed there are many things which cannot well be explained otherwise. I do not venture to say that from this source he first derived the use of fire; yet it does not seem that in such an instinct there would be anything more remarkable than in that which leads the bee, with the skill of a mathematician, to construct his hexagonal cells; and considering how terrible and destructive an agent fire, if discovered accidentally, must have appeared to be, it is difficult to conceive how uncivilized and untutored man could have been led by mere experience to convert it to the purposes of his own comfort and convenience. It may be further observed that except in the tropical regions of the globe fire is almost as necessary to his existence as food or clothing; and that without it he could not have filled that place which he seems to have been destined

to fill in the creation. It was probably under the influence of views similar to these that the Heathen mythologists invented the fable of Prometheus having stolen it from the Gods.

On the other hand, if we study the habits of other animals, we cannot doubt that there are many which, however much they are dependent on their instincts, profit also by experience, though in a less degree than man; and it is probable that these, not less than the human species, when first called into existence were endowed with instincts which they do not now possess.

ERGATES. Continuing your line of argument, I may observe that the circulation of the blood, respiration, digestion, the secretion of the kidneys, being immediately necessary to life, are nearly the same under all circumstances, being subject to no material variation except when interrupted by accident or disease. There are certain instincts to which the same observation may be applied. A patient in a lunatic asylum may, as a consequence of his malady, lose the instinct which constitutes the desire for food, so that he would die of inanition

if food were not introduced into his stomach by artificial means; or the instinct of self-preservation may be so overpowered, that he commits suicide. But otherwise these particular instincts are as invariable as the functions of the vital organs. There are other instincts which are intended to adapt the animal to the peculiar situation in which he is placed, and liable to vary with the circumstances for which they are required. Acquired habits in several successive generations become permanent, and assume the character of instincts, and thus we have the opportunity of seeing new instincts generated. I walked in the fields during the autumn with a young pointer dog which had never been in the fields before. He not only pointed at a covey of partridges, but remained motionless, like a well-trained dog. M. Magendie relates an analogous anecdote of a retriever. He bought him as a puppy in England, and took him to France. Though never having been trained for the purpose, he knew his duty as a retriever, and performed it sufficiently well when taken into the fields. Mr. Andrew Knight has given

an account of other facts of the same kind. It is probable that if we had the opportunity of studying the conditions of the herds of wild horses which roam over the prairies of America, we should find that they are born with instincts which their ancestors did not possess in their domesticated state, and which they would lose if again brought under subjection to man.

CRITES. May not the habit of using the right hand in preference to the left be one of the acquired instincts to which you have now referred?

ERGATES. Certainly it may be so. But it is at least as probable that it was an original instinct. We know that some individuals are left-handed, but the proportion of them is very small, and I am not aware that there has ever been a left-handed nation. The reason of our being endowed with this particular instinct is sufficiently obvious. How much inconvenience would arise where it is necessary for different individuals to co-operate in manual operations, if some were to use one hand and some the other?

However that may be, we must suppose that the conversion of an acquired habit into an instinct is attended with some actual change in the organization of the brain; and in this there is nothing more remarkable than in many other changes which occur in animals in consequence of an alteration in their mode of life. Thus the thorough-bred horse has more compact bones and a thinner skin than the cart-horse. The elephant which had been preserved in a mass of ice on the borders of the Northern ocean was covered with hair, which is altogether wanting among his kindred of the South; and still more remarkable examples of changes of this kind may be found among our domesticated animals, especially in dogs.

CRITES. This is a subject which is not only interesting as a matter of science, but also of considerable practical importance. Setting aside his physical condition, and the influence of another climate on his health, would the infant born of Esquimaux parents, living in huts of snow, in the dreary regions of the north, be equally fitted with the negro to assume the

habits and mode of life of those whose ancestors have resided during many successive generations under a tropical sun, amid the luxuriant vegetation of a tropical climate? or would the infant negro be fitted to undertake the life of the Esquimaux? The negroes of Haiti, who passed at once from a state of slavery into that of freedom and the imitation of civilized life, are already relapsing into barbarism, and returning, in spite of the humanising influence of Christianity, to the superstitions of their African progenitors. In like manner, nations become adapted to the peculiar mode of government under which their ancestors have lived; and experience has shown that it is equally dangerous suddenly to change a despotism for a free constitution, or the latter for a despotism. The original founders of the French revolution had grand objects in view. They saw how much free institutions tend to elevate the character and extend the happiness of mankind, and they had formed a just estimate of the opposite tendency of the former government of their country. But they overlooked the fact, that

no government is good for which those who are to live under it are unprepared, and they failed by attempting too much. If they had been content with beginning the work of regeneration with a prospect of a further but gradual improvement in the course of after generations, it is probable that their country would never have groaned under the tyranny of the mob, nor have sought refuge from it under the milder despotism of the Emperor. On the same principle it is that civilization can be only gradually advanced; and that all that the Czar Peter could accomplish was to produce an outward semblance of it in his capital, while the masses of the large population of his empire remained as barbarous as they were before he attempted to force civilization on them. The sudden emancipation of the negroes in the slave-holding states of America would be productive of nothing but misery and ruin to themselves and the white population; while there is good reason to believe that a different result would follow if they and their masters were gradually prepared for so great a change

during even two or three successive generations.

EUBULUS. In what you have now said you have in part anticipated some observations which I was about to offer. While the study of instincts in other animals is interesting to the naturalist and physiologist, that of the instincts of the human race is not less interesting to the moral, and, I may add, to the political philosopher. The majority of instincts belonging to man resemble those of the inferior animals, inasmuch as they relate to the preservation of the individual and the continuation of the species. To these the social instinct is superadded, not indeed, peculiar to man, but in him attaining a greater degree of development than in other creatures. This may be regarded as being in many respects antagonistic to the other instincts; and in order that society should exist, it is necessary that the latter should be in a great degree subjected to the former. The first impulse of a hungry man, not less than that of a hungry wolf, is to possess himself of food wherever he finds it. When Dr. Davy,

on the bank of a river in Ceylon, found the young alligator just escaping from his egg, the newly-born animal, assuming an attitude of defiance, bit the stick which opposed his progress. So the natural disposition of man is to defy opposition and resent injury. The child who can scarcely walk, beats the table against which he has struck his head. The social instinct is intended not to extinguish but to modify and correct his other instincts. But for the attainment of this object it is not in itself sufficient. It requires the aid of experience, education, example, and reason. In proportion as the intellectual faculties are more perfect, so is the social instinct more efficient. The gregarious elephant is more intelligent than the solitary tiger. As the dog is more intelligent than the cat, so has he social and moral qualities which the latter does not possess ; and in like manner human society is a more perfect institution than that of any other animals which live in association. Nor must we omit the operation of another cause which mainly contributes to the attainment of that higher degree of civilization in which the

sentiment of duty prevails over the more selfish appetites. The disposition of man, even in his most degraded state, to believe in supernatural agencies is so universal, and so manifestly the result of his peculiar constitution, that we must regard it as having very much of the character of an instinct. As he advances in knowledge and has leisure for observation and reflection, the perception of the beauty, grandeur, and harmony of the universe, of the evidence of intention and design, and of the adaptation of means to ends in everything around him, and of the large amount of good with the small proportion of evil, which is manifested in the condition of all living creatures, leads him to the knowledge of an intelligent and beneficent Creator, to whom he *may* at any rate be responsible for the right use of the faculties with which he is endowed; and thus the religious sentiment becomes engrafted on the rude instinct of the savage. Thus, man as he exists under the best form of civilization, is made what he is by the operation of various causes. There are his original instincts, with-

out which he could no more have continued to exist than without the action of the heart. There are habits, which begun in one, and continued in subsequent generations, become confirmed in him, and bear a close resemblance to instincts. These modify and correct each other, and they are all, in a greater or less degree, under the dominion of the intellect. Such is the general view which we must take of his condition; but if we attempt to make a more exact analysis of it, we find the problem too complicated for a satisfactory solution; the various influences to which he is subject being so intermixed with each other, that it is impossible for us to determine in each particular instance how much of his sentiments and conduct is to be attributed to one of them, and how much to another.

CRITES. You have referred to the disposition of human beings to believe in supernatural agencies as partaking of the character of instincts. If you are correct in so doing, it seems to me that you may with equal reason include in the same category our belief in the existence

of a material world; our belief that what we remember as having happened, did really happen; in short, in all that some have intended to describe under the name of innate ideas, and that Buffier, and Reid after him, regarded as primary and fundamental truths; the knowledge of which is forced upon us by our own constitution, and is independent of experience and reasoning. Now, although I do not admit the exactness of the catalogue of these primary truths, which has been furnished by the writers whom I have mentioned, and, indeed, do not doubt that they have included in it some kinds of knowledge which are derived from other sources, yet I do not dispute the correctness of their general views; and, indeed, it is plain that it has been practically admitted by even the most sceptical of those philosophers who have written on the subject. But are we really justified in regarding such kinds of belief as being of the nature of instinct?

EUBULUS. They differ from instincts in one very essential circumstance. It has been shown that instincts are far from being constant and

immutable; as under a change of circumstances certain instincts are lost, so are others generated. Even those which are of the greatest necessity, which seem to be the most constant, may, under certain circumstances, be found to be wanting in an individual in whom they had been fully developed previously. But it is otherwise with those articles of primary belief which are represented as the foundation of all our knowledge. However the lunatic may be deceived by his illusions, or however convincing the arguments of the metaphysician, neither the one nor the other can escape from the belief that there is an external world independent of himself, or that what he remembers to have happened did actually occur. Taking these things into consideration, it seems not unreasonable to suppose that this class of convictions has some higher source than that which belongs to mere instincts, and that they are actually inherent in the mental principle itself, and independent of our physical organization.

THE SIXTH DIALOGUE.

Views of Human Nature. — The Science of Human Nature — its Objects and Applications — to be distinguished in its higher Department from the mere Practical Knowledge of Human Character which Men acquire for their own Purposes. — Different Opportunities of pursuing the Study of Human Nature presented to different Individuals. — The Observation of the Influence of the Body on the Mind, and of the Mind on the Body, a necessary Part of it. — The Science of Human Nature essential to the Science of Government. — The Pretensions of Phrenology. — Anatomical Objections to it. — Observations on the Evidence on which it rests. — Consideration of the Question as to the Relation of the Size of the Brain to the Development of the Intellect. — General View of the Circumstances which tend to form or modify Men's Characters. — The Science of Human Nature not reducible to any Simple Rules. — Qualifications necessary for the Pursuit of it. — Self-knowledge. — Duties and Responsibilities. — Conclusion.

THE term which we had allotted for our visit was drawing to a close. On the day preceding that of our departure, after wandering for some time exposed to the rays of an August sun, we found ourselves enjoying the shelter of the beech

wood, which I have already mentioned as being in the neighbourhood of our friend's habitation. A tree which had been lately felled afforded us a seat. The cool shade was refreshing to us after the glare and heat of the sunshine in the open country; and the stillness and silence which prevailed afforded us the opportunity of renewing our conversation on subjects connected with those which we had discussed previously.

"It is probable," said Crites, "that such feelings might not be of long duration; but I own that at the present moment the scene which is before me forms a delightful contrast to the bustle and activity of my every-day life; and that it seems that I should be well contented to escape from the turmoil of the world, and the anxieties of a profession, and pass the rest of my days in some such retirement as this,—

"'The world forgetting, by the world forgot;'

exchanging the study of the vices, caprices, and vagaries of mankind, for that of books and the contemplation of the beauties of the country."

EUBULUS. You judged rightly in saying that these feelings might not be of long duration. I can assure you from my own experience, that such a mode of life as you seem to contemplate would never satisfy you unless you were to combine with it some worthy pursuit appertaining to others as well as to yourself. You would, if thus living only for yourself, soon find the social instinct of which we were speaking yesterday, as irresistible as that of hunger; so that you might as well pretend by a process of reasoning to abstain from eating if you were famished, as from seeking the society of your fellow-creatures, when you had been for some time deprived of it.

Further, it seems to me that you are not like your usual self, and that you do not quite do justice to mankind, when you refer merely to their vices, caprices, and vagaries. It is true that of these there is much in their composition, which we might well wish to have been otherwise; but let us not overlook the numerous examples which we meet with, of kind and

generous actions, of sacrifices of self-interest made for the good of others in private, and sometimes even in public life. I have now lived long in the world, and have been mixed up with various classes of persons; and I may truly say that, although I have met with evil more than enough in others, and am not, I hope, altogether insensible of my own defects and failings, my individual experience has led me to entertain, on the whole, a better opinion of mankind than that which I should have had if I had studied the subject only in books. I speak, be it observed, of moral qualities. As to those of the intellect, I own that, some time since, when I had the opportunity of passing an evening in the company of two lads belonging to the aborigines of Australia, I was lost in wonder, and could scarcely comprehend that from so rude a stock should have proceeded a race of beings so gifted as some of these with whom it has been my good fortune to be acquainted; so full of knowledge; penetrating into the mysteries of the material world; subjecting the physical forces to their will; at the

same time analysing the phenomena of the mind itself; and ascending from thence to some knowledge, however limited, of the one Supreme Intellect which supports and regulates the universe. To us, situated as we are, with our duties and in our sphere of action, there is, I apprehend, no more worthy object of study than man himself; his instincts and higher faculties, his past history, his future destiny; in short, the "science of human nature" taken in its most extended sense. And in this sense it is a most extensive science indeed, including as it does anatomy and physiology; intellectual, moral, and political philosophy; ethnology, and I know not how much besides. Even the most abstract sciences, though not directly, are indirectly related to it, as we value them only in proportion as they tend to gratify the curiosity, supply the necessities, or elevate the character of man. As we commonly understand it, however, the science of human nature has a more limited signification, implying a knowledge of the instincts, the passions, the intellectual capacities, the active power of our species, and,

above all, the motives by which the conduct of individuals is regulated.

CRITES. Such as you have now described it, it may be said to be a science, which belongs as much to every individual among us as to the philosopher, dependant as we are on each other, and compelled as we are to learn something of the characters of those with whom we associate. The rich man's valet studies his master's temper and caprices, learns to anticipate his wants; in those matters in which he is himself concerned, saves him the trouble of acting and even of thinking for himself; and thus at last acquires an influence over him, which is not the less real because his master is unconscious of it. The statesman, the lawyer, the merchant, the medical practitioner, the speculator, these and others, in their several ways, study the disposition of other men, as far as it is necessary for them to do so, with a view to their own advantage, or to enable them better to perform the duties belonging to their respective callings.

EUBULUS. It seems, however, that we are

scarcely justified in dignifying the practical knowledge of human nature which men generally possess with the title of a science. For the most part they view it under only one of its numerous aspects; the sight of each individual not extending beyond the little clique to which he himself belongs; and there are none to whom this remark is more generally applicable than to those, who, independent of their own exertions, are born to the inheritance of ease and affluence. Those who study human nature as a whole form an exception to the general rule. Some have not the talent of observation; others have not the necessary leisure; and of those who are not wanting in these respects the greater part have not the inclination to do so.

CRITES. You may add that many have not the opportunity. Inquiries such as these cannot be carried on in a closet. They belong altogether to active life. Then be it observed that in some situations you come in contact only with a particular class, while in others the field of observation is more extensive. It seems

to me that medical practitioners, if they know how to avail themselves of it, have in this respect an advantage over most other professions; partly, because they have to deal with every order in society, from the high-born patrician and prosperous millionnaire, down to the poor man in the hospital, seeing them as they really are, under those circumstances of trial, which, more than anything else, level all artificial distinctions; but more especially, because they are necessarily led to contemplate the mind, not simply in the abstract, as is the case with the mere metaphysician, but in connexion with the physical structure with which it is associated.

ERGATES. Certainly the opinion which you have now expressed seems not to be without foundation. It is the business of medical practitioners to study, not only the influence of the mind on the body, but also that of the body on the mind; and, in so doing, they have the opportunity of learning more than others to trace moral effects to physical causes. To them, human nature, however it may be disguised, is

but human nature still. Where others complain of a fretful and peevish temper, it may be that they are led to make allowance for the difficulty of self-restraint, where there is a superabundance of lithic acid in the blood, or an organic disease of the viscera. In the catalepsy induced in a nervous girl by the so-called mesmeric passes, they see only one of the numerous phases of that multiform disease, hysteria; and in the mischievous, and sometimes even in the benevolent enthusiast, who, by his sincerity and earnestness, enlists in the cause which he undertakes the sympathy of the multitude, their more experienced observation will often detect the commencement of illusions and the germ of insanity.

It would, however, be a very great mistake to regard this kind of knowledge as being altogether peculiar to medical practitioners. In fact, the connexion between the mind and body is in many instances too palpable to be overlooked by any practical observer of mankind. For example, it is referred to by Lord Chesterfield, when he says that many a battle has been

lost because the general had a fit of indigestion; and you may recollect that I stated on a former occasion that Mr. Chadwick has clearly exposed the influence of living in an unwholesome atmosphere as inducing the habit of gin-drinking with all the frightful moral consequences which follow in its train. Still it must be admitted that members of the medical profession have better opportunities of obtaining knowledge of this kind than most other persons. Hence it is that in many things which, in these days of education, and in spite of the advancement of knowledge, others regard with wonder as the result of some unknown and mysterious agency, they, with some rare exceptions, see nothing that is not to be explained on well-known principles, or in any degree more remarkable than the exploits of M. Robin or other conjurors.

Eubulus. Some may pursue the inquiry with more or less of a philosophical spirit, and others merely as a matter of practical observation and experience; but Crites has truly stated that some knowledge of human nature

is necessary to all those who have any duties (however small) to perform in society, and the higher and more arduous these duties are, the greater is the amount of knowledge that is required. It forms the most essential part of the science of government, and to the want of it may be attributed many national calamities, and the greater part of the mistakes made by those to whom the affairs of nations are entrusted. The principal advantage possessed by an adventurer such as Cromwell, or the first Napoleon, is, that he cannot have risen by his own exertions through the various grades, which he has occupied in the course of his career, associating with others on equal terms, without acquiring an insight into men's minds and characters, which it would not have been possible for him to have acquired otherwise. The unhappy Louis XVI. and Marie Antoinette, surrounded as they had been by the etiquette, and misled by the adulation, of a Parisian court, received almost their first lessons in human nature from the brutal frenzy of a revolutionary mob. How different might have

been the result, both for themselves and for Europe, if they had enjoyed a more familiar intercourse with their fellow-creatures; or if at the head of a constitutional government, they had the opportunity of seeing the thoughts and feelings of the public and the spirit of the times reflected by an independent press! The great Duke, if he could have had an army such as he required, made to his hand, might, by his military skill, have been a successful general, and "the conqueror of a hundred battles," but it would have been still a problem how that army had been created, and how he surmounted the various difficulties which he had to encounter, if the publication of his despatches had not disclosed to us the great insight which he possessed into the moral and intellectual qualities of others. A statesman may form grand conceptions in his closet, but these will be of little avail if he knows not how to select the right men to carry his plans into execution; or if, overlooking, or being ignorant of, the various characters of the different races of mankind he applies to one of

them a mode of government which is fitted only for another.

CRITES. From the way in which you treat the subject, I suspect that you have disregarded, or at any rate are not a convert to, the doctrines of phrenology. Nevertheless, among my friends I am acquainted with some, and those too persons of much intelligence, who believe that these afford a sort of Royal road to a knowledge of men's dispositions and characters; and I well remember that, some years ago when Lord Glenelg occupied the situation of Colonial Secretary, a memorial, signed by many persons of repute, was addressed to him, seriously proposing that he should adopt the phrenological method of investigation, with a view to a classification of the convicts before they were transported to the colonies; it being further proposed that an experienced phrenologist should be taken into the service of the state, for the purpose of making the necessary examination of their heads.

I do not mean to say that I am myself either a believer or an unbeliever in the

system; and I am led to mention it chiefly because Ergates, who has attended more than I have to questions of this kind, seemed, in one of our former conversations, to admit that there may be some foundation for these doctrines, when he expressed an opinion that the brain is not a single organ, but a congeries of organs, each having its peculiar function allotted to it.

ERGATES. Such, certainly, is the conclusion at which I have arrived, and which seems to derive confirmation, both from the anatomical structure of the brain, and from the observations of experimental physiologists. But you must not, therefore, suppose that I have the smallest faith in what is called phrenology, which is quite a different matter. The phrenological theory is, that of the various instincts, dispositions, and talents, each has a separate organ allotted to it; that these organs, with only a single exception, are situated in the hemispheres of the cerebrum; that, in proportion as they are more or less developed, so is there a greater or less development of the

faculties or qualities which they represent; that by the external figure of the head the relative size of these various organs may be ascertained; and, lastly, that we have thus afforded to us the means of determining the characters of individuals, so as to form a pretty accurate notion of what their future conduct will be, independently of all experience as to their conduct formerly. Now, there are two simple anatomical facts which the founders of this system have overlooked, or with which they were probably unacquainted, and which of themselves afford a sufficient contradiction of it.

1st. They refer the mere animal propensities chiefly to the posterior lobes, and the intellectual faculties to the anterior lobes of the cerebrum. But the fact is that the posterior lobes exist only in the human brain, and in that of some of the tribe of monkeys, and are absolutely wanting in quadrupeds. Of this there is no more doubt than there is of any other of the best-established facts in anatomy; so that, if phrenology be true, the most marked

distinction between man, on the one hand, and a cat, or a horse, or a sheep, on the other, ought to be, that the former has the animal propensities developed to their fullest extent, and that these are deficient in the latter.

2ndly. Birds have various propensities and faculties in common with us, and in the writings of phrenologists many of their illustrations are derived from this class of vertebral animals. But the structure of the bird's brain is essentially different, not only from that of the human brain, but from that of the brain of the mammalia generally. That I may make this plain, you must excuse me if I repeat what I said on the subject formerly. In the mammalia, the name of *corpus striatum* has been given to each of two organs of a small size compared with that of the entire brain, distinguished by a peculiar disposition of the gray, and the fibrous, or medullary substance, of which they are composed, and placed under the entire mass of the hemispheres of the cerebrum. In the bird's brain, what appears to a superficial observer to correspond to

these hemispheres is found, on a more minute examination, to be apparently the *corpora striata* developed to an enormous size; that which really corresponds to the cerebral hemispheres being merely a thin layer expanded over their upper surface, and presenting no appearance of convolutions. It is plain, then, that there can be no phrenological organs in the bird's brain corresponding to those which are said to exist in the human brain, or in that of other *mammalia*. Yet birds are as pugnacious and destructive, as much attached to the localities in which they reside, and as careful of their offspring, as any individual among us; and I suppose that no one will deny, that if there be special organs of tune or of imitation in man, such organs ought not to be wanting in the bullfinch and parrot.

Eubulus. I do not pretend to have much knowledge of anatomy, but even without it — from the perusal of the writings of Spurzheim and some other phrenologists — I had come very nearly to the same conclusion with that which may be deduced from the facts men-

tioned by Ergates. It seems to me that the classification of faculties which these writers have made is altogether artificial, and that it is not at all reasonable to suppose that for each of these a special material organ must be required. If we admit the separate existence of the thirty-three faculties, or propensities, enumerated by Spurzheim, we might with equal propriety admit the existence of many others, for which, however, the phrenological map of the head leaves no vacant space.

Then, when I consider the evidence on which the determination of the seat of the several organs is founded, I can conceive nothing more fantastic or unsatisfactory, or more unlike that which is considered to be necessary to the formation of just conclusions in other sciences.

Sometimes the seat of a particular organ is ascertained by a particular part of the head being warmer than the rest. It was thus that Dr. Gall was first led to detect the seat of the sexual passion in the cerebellum.* But is it

* See Additional Note I.

really the fact that one part of the head is warmer than another if they are equally covered or uncovered? Was it ever found to be so by a delicate thermometer? or is it at all probable that so much more heat should be generated in one portion of the brain than is generated in other parts, as to be perceptible through the bone and skin, and the hairy scalp?

The organ of philoprogenitiveness, by which parents are impelled to love their offspring, is said to be placed in the back part of the head, in the posterior lobes of the cerebrum, immediately above the cerebellum. Now observe in what manner this discovery was effected. Dr. Gall found a protuberance in this part of the heads of women, and for five years he meditated on the subject, but could advance no farther. At last he discovered a similar protuberance in the heads of monkeys. The question then arose, what is there in common between women and monkeys? At this point he obtained the assistance of a clergyman, who observed that monkeys are very fond of their

offspring, and thus solved the difficulty: the conclusion at which he had arrived being afterwards confirmed by the following circumstance: — A woman in whom this part of the head was unusually prominent, being ill of a fever, and (we may suppose) delirious, believed herself to be pregnant with five children.

I shall trouble you by giving another example of the manner in which these researches were conducted by the two founders of the phrenological system. They are both of opinion that the organ of pride is situated in the back part of the head, and hence it is, as Dr. Spurzheim has observed, that "all the motions of pride take place in the direction upwards and backwards." But Dr. Gall further believes that it is the greater development of this organ which leads certain animals to prefer to live in elevated situations. Thus there is a proud rat which lives in hay-lofts, and in the attic story of a house; and another, an humble rat, which is content to grovel in cellars and gutters. It is under the same influence that certain children and little men

display a proud disposition by climbing on the backs of chairs, and that kings and emperors are seated on elevated thrones.

CRITES. I do not undertake to defend such far-fetched illustrations as those to which you have referred; and I am ready to admit that even those which are offered by Mr. George Combe (though his phrenological treatise displays very much more of a philosophical spirit than those of his predecessors) partake too much of the same loose and unscientific character. Being no anatomist, I cannot venture to make any observations on the anatomical statement which has been made by Ergates. Still, setting aside all other considerations, if it be true that there are persons who, from the examination of the shape of a man's head, can form a pretty accurate notion as to his character, however the fact is to be accounted for, there must be something more than what is merely fanciful in phrenology. Facts are not to be rejected merely because the explanation offered of them proves to be erroneous; and I have not only heard of

them from others, but have myself known instances of such shrewd observations on character made by phrenologists that I can scarcely believe them to have been purely accidental.

EUBULUS. I do not in the least doubt the accuracy of your statement; and indeed I might refer to a part of my own experience in its favour. But I might also refer to still more numerous instances in which the phrenological examination of the head has proved to be a failure. You may perhaps regard me as being in some degree a prejudiced witness, and I will therefore merely refer you to an account, published some years ago, of the visit of Dr. Gall, the inventor of the science, to Sir Francis Chantrey's studio; when he pronounced the head of Sir Walter Scott (who had not the smallest turn for mathematics) to be that of a great mathematician; that of Troughton, the mathematical instrument maker, to be the head of a poet; and at the same time discovered the indications of a superior intellect in another head, the living proprietor of which had cer-

tainly as little claim as any man could possibly have to be thus distinguished.

But even if the errors of phrenology were less numerous than I believe them to be, that would not go far towards convincing me of the value of their art. It is not very difficult for a clever observer of human nature to form a notion of some part of a man's character in the course of a brief conversation with him; and an enthusiast in phrenology may very honestly persuade himself that he has obtained from the examination of his head that knowledge which he has really obtained from other sources. Then observe how comprehensive the faculties and propensities of the phrenological system are supposed to be. A large development of the organ of destructiveness in the head of Hare the murderer, explained how it was that he was led to murder sixteen human beings that he might sell their bodies.* But in the head of another person who never committed a murder it is sufficient to find that it exists in

* A System of Phrenology, by George Combe, 5th edition, vol. i. p. 262., &c.

combination with a disposition to satire, or to deface mile-stones; and in the beaver and squirrel, it explains how it is that these animals are impelled to cut and tear in pieces the bark, leaves, and branches of trees, for the innocent purpose of constructing their cabins and nests. So the large size of the organ of acquisitiveness not only leads one person to be a thief and another to hoard, but it also explains the habits of the spendthrift (who does not hoard at all); and it impels storks and swallows to return after their migrations to establish themselves, each succeeding year in the same locality. Following these examples, I do not see that a phrenologist can be much at a loss in finding a character for any individual suited to the peculiar configuration of his head. But observe further, if a difficulty were to occur, how easily it may be explained away by an ingenious phrenologist. If ever there was a race of thoroughly remorseless murderers in the world, such were the Thugs of India. Generation after generation they were born and bred to murder. They looked to murder as the source

not only of profit but of honour. Dr. Spry sent the skulls of seven of these demons, who had been hanged at Saugor, to some phrenological friends in Scotland. To their surprise, destructiveness was not a predominant organ in any one of them. But the anomaly was soon explained. The Thugs, it was said, had no abstract love of murder, but murdered for the sake of robbery.* It would not be easy to show that there was any difference between the Thugs and Hare, or Burke, or Bishop, in this respect.

ERGATES. After what I have already said, you will scarcely suspect me of being a convert to the doctrines of phrenology. We must not, however, lose sight of the facts, that idiots for the most part have small heads, and that we are generally agreed in considering a large head and a capacious forehead as indicative of superior intellectual endowments. In like manner as the ancient sculptors gave to the figures of some of the Heathen Gods the appearance of youth, by shortening the jaws so that they

* India, Pictorial and Historical, London, 1854, p. 356.

could not be supposed to contain the entire number of teeth belonging to the adult, so they expressed the Divine Intelligence of others by increasing the dimensions of the forehead. But even to this rule there are exceptions. Some very stupid persons, within my own knowledge, have had very large heads. On the other hand, if we may trust to the authority of the bust of Newton in the apartment of the Royal Society, the head of that mighty genius was below the average size; and Moore describes the head of Byron as having been unusually small, with a narrow forehead; the fact being confirmed by an anecdote related by Colonel Napier, of a party of fourteen persons having tried to put on his hat, and having found that it was too small to fit any one of them. On a former occasion I adverted to an hypothesis by which these anomalies may be explained. The nervous force is supposed to be generated in the gray or vesicular substance, of which the greater part is expanded on the surface of the cerebral hemispheres, the extent of that surface depending not so much on the bulk of the entire

brain as on the number and depth of the convolutions. Without, however, having recourse to this explanation, it is easy to suppose that a more or less refined organization may make all the difference, so that the smaller brain of one individual may be a more perfect instrument for the mind to use than the larger one of another.

EUBULUS. Men's characters are indeed compounded of so many elements, and are influenced by so great a variety of circumstances, that it is difficult to understand how they can be determined by any such simple rules as those laid down by the phrenologists.

First, there are those original and necessary instincts, without which the human race could not exist at all, but which are nevertheless, in like manner as the higher or intellectual faculties, more complete and of greater intensity in some individuals than they are in others. Then there are those habits which are gradually acquired during several successive generations, by which chiefly the different races of mankind are distinguished from each other; which cause

one nation to be peaceful and another warlike; which engender low-mindedness and cunning in those who have had an uncertain tenure of life, or liberty, or property, under an arbitrary and oppressive government; and give rise to liberal sentiments, and an open and manly bearing in those who have had the advantage of belonging to a free and well-regulated community. To these we may add those other habits and modes of thinking which are the result of early discipline and training in individual cases; which dispose him who has been brought up among thieves to become a thief; which caused the spoiled child, whatever his original disposition may have been, to grow up into the selfish man; which explain how it is that of two persons with the same amount of natural talent, one remains from the beginning to the end of his life absorbed in frivolous pursuits, and dies unregretted, or perhaps despised; while the other is distinguished for his genius and superior intellectual attainments, transmitting his name to posterity as that of a benefactor of the human race. If we pursue

the inquiry further, we find that in addition to moral agencies such as I have enumerated, there are various physical agencies which co-operate with them in forming individual characters. One man is in that state of bodily health, that even in spite of adverse circumstances he is always cheerful and contented, ready to sympathize with others, and obtaining their sympathy in return. Another oppressed by chronic dyspepsia, or visceral disease, or having his nervous energies exhausted by excessive labour. is in that condition which causes every impression made on him to be attended with more or less of an uneasy feeling; and hence he is fretful and peevish, doubtful as to himself, suspicious of others; so that it is only under the influence of a high moral principle, and by a constant effort of self-control, that he can avoid being ungracious in his general behaviour, and, in his dealings with mankind, bring himself up to the level of his more fortunate competitor. Nor are physical agencies of another kind less influential in other ways. It cannot be supposed that the young gentleman of fashion,

whom I remember to have seen described in one of the police reports as never being without a cigar in his mouth, except when he was at his meals, or when he was asleep, had any other than a muddled intellect; and the alcohol circulating in the vessels of the habitual drunkard must have even a more injurious influence than the poison of tobacco. We may carry our inquiries further still, and in doing so we find the problem to become still more complicated. How often does it happen that the character alters as years advance! The young man who enters on his career in the possession of what are called great worldly advantages, full of hope, flattered by those around him, and expecting of life more than life can bestow, incurs a great risk of becoming in the end a disappointed misanthrope. So the spendthrift of one period may be the miser of another; and he, whose early efforts obtain for him the reputation of superior intelligence, not unfrequently ends where he began, having allowed his talents to run to waste, and never accomplished anything afterwards by which he might

be distinguished from the herd of ordinary mortals.

ERGATES. You may include in the same category the changes which take place in advanced life, and which are undoubtedly to be attributed to an altered condition of the brain; beginning with the imperfect recollection of late events, and ending with that more complete failure of the memory, which seems to be the true, as it is the all-sufficient, explanation of the fatuity occasionally met with in extreme old age.

EUBULUS. There can be no question as to the occurrence of the changes which you mention. But it is worthy of notice that, while in old age the recent impressions on the memory are evanescent, it is quite otherwise as to those which were made formerly; and hence it is that the old man, whose mind wanders when he speaks of what has happened to-day or yesterday, may be quite clear and coherent when he goes back to the scenes of his early life; and that it is on these especially that he loves to dwell during the day, while they form almost

the entire subject of his dreams at night. At the same time my own observations lead me to believe that the failure of the mind in old age is often more apparent than real. The old man is not stimulated by ambition, as when he felt that he might have many years of life before him. He has probably withdrawn from his former pursuits, and has substituted no others for them; and we know that the mind as well as the body requires constant exercise to maintain it in a healthy state. Where it is still occupied we frequently find it to survive the decay of the body, retaining its energy and vigour even to the last.

The further we extend our inquiries in this direction, the more difficult it seems to understand how any simple rules can be laid down for explaining and determining men's characters. It has been reported of a celebrated prime minister of the last century, that he held every man to have his price. The anecdote may or may not be true; but if it be so, the answer to such an ungracious doctrine is sufficiently obvious. He drew his conclusions from a too

limited experience, and did not bear in mind that those who had not their price were just the persons with whom it was least likely that he should come in contact. Adam Smith has been, to a considerable extent, successful in referring to that involuntary sympathy (or instinct) which causes us to participate in what is felt, or what we suppose to be felt, by others, as the foundation of our moral sentiments. But this simple and beautiful theory does not explain the whole. It overlooks the disturbing influences arising out of peculiarities of the physical organization: and it has not sufficient reference to the intellectual faculties, which in all the concerns of life are so mixed up with the moral sentiments, each influencing the other, that to study either of them separately, is as useless as it would be to study geology without reference to chemistry and mineralogy; or the phenomena of the living body disregarding the laws which operate on inorganic matter. What I have ventured to call "the science of human nature" is a department of knowledge, in which I will not say that we recognize no leading principles, but in

which we recognize none that will supersede the necessity of minute observation, and an extended individual experience. For all practical purposes the study of it must be conducted very much in detail, and no man can make much progress in it whose views are limited to one variety of the human species, or to one class in society; or whose situation is such that he is merely a looker on, and not himself an actor in the busy drama of life.

CRITES. You may add that whoever would understand the minds of others, and exercise an useful influence over them, must first understand himself. He who forms a wrong estimate of his own capabilities, of his own prejudices, and of the weak points of his own character, measures the characters of others by an erroneous standard. Not only is he in constant danger of undertaking that which he is not qualified, and of neglecting that which he is qualified, to perform, but he is at the mercy of others, who although they may very probably be inferior to himself in some of the nobler qualities, obtain a dominion over him by study-

ing his defects, and making them subservient to their private purposes.

EUBULUS. Whatever they may have been otherwise, the priests of the Delphic Oracle were certainly no impostors when they displayed that simple but significant inscription "Γνωθι σεαυτον" over the portico of the temple of the heathen god. If self-knowledge be important as the first step towards a knowledge of the characters of others, on other grounds it is more important still. Though we may admit, with Ergates, that the mental principle must be of the same essence, under whatever form it exists, still there can be no question as to the vast superiority of the mind of man to that of all the created beings by whom he is surrounded. But in what does that superiority consist? Other animals, and more especially the gregarious, are not without an ample share of the moral sentiments. We see them displayed in the dog, who rejoices in being your companion, and who flies to your assistance if you are attacked; in the attachment of the elephant to his keeper who treats him kindly, and in his

resentment of injuries; in the roebuck, who pines and dies if separated from his mate; and even in the cat, who, peaceful at other times, turns round on you in anger if you interfere with her kitten. It is not as to these, but as to his intellectual faculties, that there is so vast a difference between man and other animals, that none can be said even to approach him in this respect. But this distinction is not without its price. It imposes on him duties of a higher order, and greater responsibilities. He is required not to yield to the impulse of the moment, but to look to the more remote consequences of what he says and does; and to keep not only his instincts and passions, but even his thoughts, in subjection to his will. Nor can this be rightly accomplished by any one who does not regard his own powers, his own disposition, and his peculiar moral temperament, influenced as it is by his physical condition and his mode of life, as a fit object of study, even more than anything external to himself. This brings us to other inquiries of the highest interest, involving as they do so

much of what is of the greatest importance to ourselves and others; inquiries which have not been neglected by heathen philosophers, but which assume a more exalted character, when pursued by those who, under the influence of a purer faith, feel that they are answerable to one almighty power for the right use of the faculties with which they are endowed. But on these we have no leisure to enter at present. Whatever may be the value of our discussions, from the arrangements which you, my friends, have made, we must consider them as closed.

"*Quæ cum essent dicta, finem fecimus et ambulandi et disputandi.*"

ADDITIONAL NOTES.

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Note A. Page 31.

The following eloquent passage, extracted from Dr. Newman's lectures, will be read with interest in connection with the observations of Sir Walter Scott and Sir Humphry Davy, referred to in the text: —

Self-educated persons "are likely to have more thought, more mind, more philosophy, than those earnest but ill-used persons, who are forced to load their minds with a score of subjects against an examination; who have too much on their hands to indulge themselves in thinking or investigation; who devour premiss and conclusion together with indiscriminate greediness; who hold science on faith, and commit demonstrations to memory, and who too often, as might be expected, when their period of education is passed, throw up all they have learned in disgust, having gained nothing by their anxious labours except, perhaps, the habit of application.

"Yet such is the bitter specimen of the fruit of that ambitious system, which has of late years been making way among us. But its result on ordinary minds, and on the common run of students, is less satisfactory still.

They leave their place of education simply dissipated and relaxed by the multiplicity of subjects, which they have never really mastered, and so shallow as not even to know their own shallowness. How much better is it for the active and thoughtful intellect, where such is to be found, to eschew the college and the university altogether, than to submit to a drudgery so ignoble, a mockery so contumelious! How much more profitable for the independent mind, after the mere rudiments of education, to range through a library at random, taking down books as they meet with them, and pursuing the trains of thoughts which his mother wit suggests! How much healthier to wander into the fields, and there with the exiled prince to find 'tongues in the trees, books in the running brooks.' How much more genuine an education is that of the poor boy in the poem, — a poem, whether in conception or execution, one of the most touching in our language, — who, not in the wide world, but ranging day by day round his widowed mother's home, a dexterous gleaner in a narrow field, and with only such slender outfit

"'As the village school and books a few supplied,'

"contrived, from the beach, and the quay, and the fisher's boat, and the inn's fireside, and the tradesman's shop, and the shepherd's walk, and the smuggler's hut, and the mossy moor, and the screaming gulls, and the restless waves, to fashion for himself a philosophy and poetry of his own."

NOTE B. Page 39.

THE question referred to in the text has been well stated by an accomplished friend of the author.

"The advocate for an immaterial principle is often unjust to his argument, in his assiduity to rid himself of those facts which attest the close and constant action of matter upon mind. They are too palpable, not only in matters of sense, but also as regards the purely mental processes, to admit of any evasion. His true doctrine lies beyond this; in asserting a principle submitted indeed to these influences, but different from them; capable of independent changes and actions within itself; and, above all, capable of self-regulation in those functions of thought and feeling to which external agents minister in the various processes of life. The ministering agents may become disturbing ones, and such they frequently are to a singular extent. But in this we have no proof of identity. Whatever of reason we can apply to an argument insuperable by human reason is against it; and the record of such instances is wholly comprised within that one great relation, which pervades every part of our present being; but the intimate nature of which is a sealed book to human research."—*Medical Notes and Reflections,* by Sir HENRY HOLLAND, Bart., M.D.; 2nd edit. p. 461.

Those who are curious in inquiries of this nature will do well to refer to another work by the same author, "*Chapters on Mental Physiology,*" especially to the chapters which relate to sleep, dreams, and insanity.

Note C. Page 72.

If a comparison of the effects produced by various stimulant and narcotic agents on the nervous system be interesting to the physiologist, it ought not to be less so to the moral philosopher and the statesman.

At one period opium was much in request among the inferior classes of the metropolis, and there were chemists who disposed of many boxes of opium pills on a Saturday night. Then gin became cheap; the gin-palaces arose, and opium was neglected. This was greatly to the advantage of the revenue. But was it of advantage to society? The effect of opium when taken into the stomach is not to stimulate, but to soothe the nervous system. It may be otherwise in some instances, but these are rare exceptions to the general rule. The opium-taker is in a passive state, satisfied with his own dreamy condition while under the influence of the drug. He is useless, but not mischievous. It is quite otherwise with alcoholic liquors. When Bishop and his partner murdered the Italian boy, in order that they might sell his body, it appeared in evidence that they prepared themselves for the task by a plentiful libation of gin. The same course is pursued by housebreakers, and others who engage in desperate criminal undertakings. It is worthy of notice, also, that opium is physically

much less deleterious to the individual than gin or brandy. Many opium-takers live to a great age, while dram-drinking induces disease of the liver, with its attendant bodily suffering, ill-temper, wretchedness, and premature death.

The effect of malt-liquor, like that of gin, depends on the alcohol which it contains, modified, however, in some degree by the sedative properties of the hop. But it is much less dangerous. According to Mr. Brande's tables, the proportion of alcohol in gin is as much as 50 per cent., while in London porter it is not much more than 4 per ceni. The porter-drinker, therefore, must drink 6¼ pints of porter to obtain gradually the effect which the gin-drinker obtains at once from half a pint (8 ounces) of gin. Gin-drinking, moreover, is in some other respects better suited to the ill-disposed part of the population. It does not distend the stomach as is the case with the more diluted liquor when taken in large quantity; and therefore does not at the time interfere so much with active exertion. It is also more economical. Eight ounces of the strongest gin (at the present price) costing about one sixth part less than their equivalent in porter.

Tobacco, as it is commonly used, is certainly less mischievous both as to the individual, and as to society at large, than alcohol. At the same time (independently of the unwholesome influence which it has on the digestive organs) there is sufficient evidence that an excessive indulgence in the use of it produces

ultimately a very ill effect on the nervous system. A distinction, however, must be made between smoking tobacco and the employment of it in other ways. It has been shown that by the application of heat above the temperature of boiling water, a new compound (the empyreumatic oil) is generated, which is not only a very much more active poison, but one which operates especially on the brain in a manner entirely different from the unprepared tobacco.

* See "Experiments and Observations on the different Modes in which Death is produced by certain Vegetable Poisons," by B. C. Brodie, F.R.S.; Phil. Transactions, 1811.

NOTE D. Page 105.

ALTHOUGH Dr. Mayo's "Croonian Lectures on Medical Testimony and Evidence in Cases of Lunacy" have been on one point referred to in the text, they were not published until a considerable time after these papers were ready for the press.

Dr. Mayo has carefully analyzed the facts which bear on the question as to what has been called "moral insanity." He has shown that many of the cases described as belonging to this category were neither more nor less than examples of insanity, according to the strict and ordinary interpretation of that term. He has shown that others, in which the plea of "moral insanity" was set up as an excuse for crime, deserved no better appellation than that of "brutal recklessness;" and that to acquit criminals of this class on the ground of irresponsibility, is only to induce others to follow in the same course, who might otherwise be restrained by a wholesome fear of punishment.

Even with regard to those who are actually insane, he is of opinion that there is a defect "in the nature of our criminal code, which recognizes no punishment for offences committed by the insane; and forces the Courts either to visit them with the same penal inflictions as would apply to the same acts committed by the

sane, their derangements being ignored, or to let them pass unpunished, however partially responsible they may appear."

Dr. Mayo has treated the whole subject, including that of mere unsoundness of mind, in the most able and lucid manner; and his observations on it are the more valuable, and will have the greater weight, as they come from one who combines just theoretical views with the practical knowledge of an experienced physician.

Note E. Page 127.

Even setting aside the cases of dying persons, or of those who labour under serious disease, there is sufficient evidence that in many instances those who appear to be insensible to external impressions are not so in reality; the apparent insensibility being the result of a strong dislike, or disinclination, to make the effort necessary for giving expression to what they feel, and of nothing more.

Esquirol describes the case of a young man who, after some disappointment in life, fell into what seemed to be a state of idiotcy. His eyes were fixed: his physiognomy was without expression. It was necessary to dress and undress him, and to put him in bed. He never ate, except when food was put into his mouth. He never walked, except when compelled to do so. He recovered after the use of some remedies, and the appearance of an eruption on his skin. After his recovery he confessed that he had never been insensible at all, but that an internal voice was always repeating to him, "*Ne bouge pas! ne bouge pas!*" and that fear alone had rendered him immovable.*

In other instances, the apparent insensibility is the result of mere imposture.

* Esquirol, op. cit. vol. ii. p. 287.

A young woman (a hospital patient) under the care of Esquirol, seemed to be in a state of profound stupor. She lay motionless in her bed, never speaking, even when pinched or pricked with a sharp instrument. A seton was made in her neck, and blisters were applied in various parts of her body, but she gave no signs of feeling, or even of knowing what was done. One day, however, when Esquirol paid her his usual visit, she had left her bed of her own accord, and from that time nothing could persuade her to remain in the dormitory at the time when he was expected.

When she left the hospital she confessed that her insensibility had been feigned. She said that one of the students had made the experiment of pinching her; that she had felt no objection to this being done by Esquirol himself, but that she did not choose to submit to what she conceived to be a piece of impertinence on the part of the student, and therefore had determined to be always out of the way when the medical attendants were to visit her.*

A case recorded in the Philosophical Transactions, very forcibly illustrates the extent to which such an imposture may be carried.

A young man, the son of a farmer in the neighbourhood of Bath, fell into what was supposed to be a state of profound sleep, which lasted during seventeen weeks. During this time he was visited by a great number of persons, and various attempts were made to

* Esquirol, op. cit. vol. ii.

awaken him, but without success. He was cupped; spirit of ammonia was held to his nostrils, and even poured into them so as to occasion inflammation and blisters, but all in vain. He slept on as before, and hence Dr. Oliver, who relates the case, was satisfied that "he was really asleep, and no sullen counterfeit, as some persons thought him."

The correctness of Dr. Oliver's opinion may, however, well be questioned: as every night his mother placed on a stool by his bed some bread and cheese and beer, which always had disappeared in the morning; and as certain functions, the necessary consequence of eating and drinking, were regularly and decently performed.*

Impostures of this kind will appear in no degree extraordinary to those who are accustomed to witness surgical operations, not performed under the influence of anæsthetic agents, and who know how common it is for patients to undergo even those of the most painful kind without uttering a complaint, or in any way expressing what they feel.

* Philosophical Transactions, 1706, vol. xxiv.

Note F. Page 176.

There probably is in the whole range of science no problem the solution of which is more difficult than that of the relation of the mental faculties to particular parts of the nervous system. Some very general propositions may be considered as established on not very insufficient data, and it is not impossible that by the method pointed out in page 173,—namely, a careful study of the habits and faculties of inferior animals, pursued simultaneously with the examination of the differences of structure of the brain, — some further insight may ultimately be obtained into this mysterious subject. It is not easy to understand in what other way this object can be obtained. The inquiry, however, is one which may well excite our curiosity, and it is no matter of wonder that it should have attracted the attention of physiologists. Those who wish to be more particularly acquainted with the views entertained by the most eminent modern physiologists may refer to Dr. Carpenter's "Principles of Human Physiology." Allusion has been made in a former part of this volume to the crude speculations of Dr. Hooke. The subject has been treated of in a more elaborate manner by a contemporary of Hooke, being the most distinguished anatomist and physiologist of the 17th century; and

the following abridged account of the conclusions at which he had arrived is offered to the reader, as it may be interesting to compare them with the opinions which are held at the present day. It is plain that the majority of these conclusions do not rest on any very sure foundation ; but "*valeant quantum valent.*"

According to Willis*, the nervous force (termed by him the animal spirits) is generated wholly in the gray or vesicular substance of the brain, which, being a kind of secreting organ, is, therefore, possessed of a higher degree of vascularity than the medullary. The convolutions of the cerebrum and the folds of the cerebellum are intended to offer a more extended surface for the gray substance, and thus to enable it to furnish a more abundant supply of the nervous force than could have been furnished otherwise. The medullary substance (in which Willis had detected the existence of a fibrous structure, having traced the fibres from the *medulla oblongata* through the *corpora striata* and *thalami*), is intended for the transmission, exercise, and dispensing of the nervous force, but not for its production.

By means of the medullary substance, connected as it is with the gray substance of the convolutions, the nervous force is transmitted to the *corpus callosum*, and this last-mentioned organ is that which is princi-

* See his treatises *De Anatome Cerebri* and *De Animâ Brutorum;* the latter, however, is chiefly occupied with metaphysical speculations, many of which relate to matters which may well be regarded as beyond the limits of human knowledge.

pally connected with the intellectual faculties; at the same time that, by combining the two hemispheres of the cerebrum, it enables them to co-operate with each other. The forms of sensible objects are preserved in the convolutions, "*tanquam in diversis cellulis et apothecis;*" from which we must conclude that Willis regarded these as especially connected with the memory. The *corpora striata* are the channel of communication between the *medulla oblongata*, the nerves, and the cerebral hemispheres. They are themselves the seat of simple sensation. But the impressions of the senses being transmitted from thence to the *corpus callosum*, and from the latter to the convolutions, become there subservient to the memory and imagination, and excite in the mind the feeling of desire, and acts of volition. The same impressions, in some instances, instead of being transmitted to the cerebrum, are, by a reflex operation, propagated in the other direction,—that is, to the nerves, producing in them effects of which the mind takes no cognizance, and motions of which we are therefore unconscious.

The cerebellum belongs more especially to what Bichat has called "organic life," and furnishes the nervous force required for the action of the heart, respiration, digestion, and the other mere corporeal functions. It is also the part principally connected with the animal instincts (*instinctus mere naturales*), and the emotions; but not exclusively so, as the other bodies, situated in the base of the brain, belong to the

instincts and emotions also. With regard to the instincts, Willis supposes the cerebellum to be associated with the cerebrum, inasmuch as the desires belonging to them can produce no effect until their influence is communicated to it, exciting in the mind, through its intervention, the act of volition. As regards the emotions also, the cerebellum is associated with the cerebrum, but in this case, the movement is in the opposite direction, beginning in the cerebrum, and from thence extending to the cerebellum, so as to affect the heart, and other organs which are under its immediate control.

Note G. Page 178.

The following case may be adduced in confirmation of the evidence which anatomy affords as to the gray matter of the nervous system being the part in which the nervous force is generated :—A young woman, of hysterical constitution, died after having been for some days in a state of great mental excitement, attended with convulsive movements of the limbs, resembling those of aggravated chorea, consequent on her having been terrified by a man who had insulted her in a most outrageous manner. On examination of the parts after death, the determination of blood to the gray matter on the surface of the convolutions was found to have been such as to make it everywhere of a scarlet colour.

The circumstance of the convolutions of the cerebrum being more numerous and complicated, thus presenting a larger surface for the expansion of the gray matter in man than in any other animal, seems to justify the opinion enunciated by Des Moulins, and adopted by Dr. Carpenter, Dr. Todd, Mr. Bowman, and other eminent physiologists, that this peculiar structure is connected with the greater extent of the intellectual faculties in the human race. The observations of Leuret, however, founded on a comparison of the brain in a large number of animals, tends to create some

doubt as to the accuracy of this conclusion.* For example, the convolutions of the brain in the sheep are numerous and well marked, while in the brain of the beaver and of the rat there are almost none at all. But who can doubt that the intelligence of the two last-mentioned animals is much greater than that of the former? Frederic Cuvier, indeed, finding that the beaver, living without companions, in the *Jardin des Plantes*, when supplied with wood, began to build a hut in the same way as when living in association, was led to believe that he was of a very low degree of intelligence, and almost wholly under the dominion of instinct.† But, on the other hand, it is affirmed by Buffon, that a solitary beaver, in a well-inhabited country, does not build a hut at all, but seeks for his residence some natural excavation on the bank of a river ‡; and Cartwright, describing the habits of beavers, as observed by him in Labrador, adduces various instances of their adapting their proceedings to the new and peculiar circumstances in which they are placed, in a way which can be attributed only to intelligence.

Monsieur Dareste suggests that the extent of the convolutions bears a relation, not to the intelligence, but to the size of the animal §, a view of the subject corre-

* Anatomie comparée du Système Nerveux, chap. 6me.

† Annales d'Histoire Naturelle, tome ix. pp. 291—318.

‡ Ibid. tome i. p. 266.

§ Comptes rendus, Janvier, 1852, Annales d'Histoire Naturelle, 3me séric, tome xviii.

sponding to that taken by Haller *, and supported by many facts. But here also there are exceptions sufficient to prevent the adoption of the general rule. For instance, the kangaroo is a much larger animal than an average dog, but the convolutions of the brain in the former of these animals are very much less extensive than they are in the latter.

* Elementa Physiologiæ, lib. l. n. 7.

Note H. Page 195.

It is but just to the accomplished and learned author of the "Philosophy of Language," that the entire passage, from which an extract has been given in the text, should be presented to the reader.

"Speech, the language of articulate sounds, is the most wonderful, the most delightful, of the arts which adorn and elevate our being. It is also the most perfect. It enables us, as it were, to express things beyond the reach of expression; the infinite range of existence; the exquisite fineness of emotion; the intricate subtleties of thought. Of such effect are these shadows of the soul; these living sounds which we call words! Compared with them how poor are all other monuments of human power, or perseverance, or skill, or genius! They render the mere clown an artist; nations immortal; orators, poets, philosophers divine!"

In the work here referred to, a just and very important distinction is made between mere language, and articulate language, or speech; the former being used as a generic term, applicable to all the different methods by which animals communicate their wants and feelings to each other; speech being used as a specific term, representing that kind of language which consists of the voice produced by the larynx, and then modified by

articulation, that is, by the action of the muscles of the throat and mouth.

According to this definition, we cannot suppose any race of animals, with the exception of some of those of the very lowest orders (the oyster for example), to be absolutely and entirely without the use of language. That the gregarious birds possess it to a very considerable extent must be plain to any one who has watched rooks in their rookery, or observed swallows collecting gradually on a parapet wall, and chattering with each other before they take their flight all at once for their winter habitations.

At the same time it would seem that the language of birds, and the gregarious mammalia, is limited to varieties of voice in the larynx; and that on man alone has been conferred the inestimable boon of articulate language or speech. Such slight modifications of the voice in the passages of the mouth and nostrils, as occur in the barking of a dog, or the bleating of a sheep, or the unmeaning imitation of certain words by parrots and starlings, cannot properly be regarded as exceptions to this general rule. The different sounds, and combinations of sounds, which may be produced in the larynx, numerous as they may be, would be quite insufficient for the complicated relations of human society, and quite inadequate to express the sentiments, and desires, and thoughts of the individuals of whom it is composed. Speech, with all its endless varieties of sound and intonation, and accent, could alone meet these requirements. If a higher order

of intellect be necessary for speech, the latter is not less necessary for the full development of the intellect. Without it, human society might have been little better than that of rooks or beavers; with it, it is impossible to say how much further progress may not yet be made in knowledge and civilization ; or, in after ages, what still higher destiny may be reserved for man, even here on earth.

As there is no instance of any, even the smallest and most degraded, community of human beings, who are without it, so we cannot do otherwise than regard the faculty of speech as having its origin in instinct. This, however, like the other instincts which appertain to man's social condition, differs materially from those which appertain merely to the individual. The latter class of instincts are simple, and in themselves complete. The former are as nothing until they have been called forth by intercourse with others, and even then are of little avail without the help of education and experience. The savage of Aveyron, who had been living wild in the woods until he was approaching the age of puberty, expressed what he felt only by inarticulate cries, and had no more notion of articulate sounds than he had of moral relations. There are many other, and apparently well-authenticated, histories of deserted children, living wild in solitude, or associating with animals ; and it is worthy of notice, that they were not only incapable of uttering articulate sounds when first they were discovered, but that, with one or two exceptions, it does not

appear that any of them ever learned to speak afterwards.* It would seem that it is only at a very early age that the ear can be taught to make that nice distinction of sounds, and the muscles of the mouth and lips be trained to those nice varieties of action, which are alike necessary to speech; an observation which is confirmed by our every-day experience of the difficulty of acquiring the right pronunciation of any foreign language with which we have not been familiar from a very early period of life. The difficulty is sufficiently great as to languages the most nearly allied to our own, but it must be immeasurably greater as to others differing more widely from it, being spoken by other families of the human race, of other habits, in other climates, and in other regions of the earth. The various modes of spelling the name of the founder of the Mahometan religion adopted by English writers show how different has been the impression which these simple Arabic sounds, have made on different English ears; and we are told that "travellers collecting the dialects of tribes in the Caucasus, and on the frontiers of India, have brought home and published lists of words gathered on the spot and from the same people, and yet so different in their alphabetical ap-

* A work entitled "Notice historique sur le Sauvage de l'Aveyron, par P. J. Bonnaterre, Professeur de l'Histoire Naturelle, &c." contains much curious information respecting, not only the Savage of Aveyron, but also respecting many other cases of children similarly deserted.

pearances that the same dialect has figured in Ethnological books under different names." * A consultation of philologists has lately been held, having for its object to invent an universal alphabet applicable to all existing languages, with a view especially to facilitate the labours of the missionaries. That something may be done in this direction is probable enough: but the most comprehensive alphabet that human ingenuity can contrive will not meet the main difficulty of the case; and, taking into consideration all the circumstances which have been mentioned, it does not seem reasonable to expect that the proposed object can be attained, except to a very limited extent.

* Proposal for a Missionary Alphabet, by Max Müller, M.A., Taylorian Professor of Modern Languages at Oxford, page 45.

Note I. Page 230.

If any one of the phrenological doctrines has been supposed to be better established than another, it is hat of the cerebellum being the seat of the sexual passion. The following extract from Leuret's work on the Nervous System will show what it is really worth : —

"Le développment comparatif de l'encéphale des chevaux soumis à la castration, et de ceux que l'on a laissés entiers devait, s'il était bien déterminé, servir à la solution des questions que je m'étais posées, et me fournir un document propre à confirmir, ou à détruire, la théorie de Gall concernant l'influence que la castration exerce sur le cervelet. M. Gérard Marchant a bien voulu faire pour moi cette épreuve, en pesant comparativement le cerveau, le cervelet, et la moëlle allongée, d'un certain nombre de chevaux entiers, de juments, et de chevaux hongres, qui servent aux opérations de l'école d'Alfort. Les pesées faites par M. Marchant, avec le concours de M. Lassaigne, offrent toute la garantie d'exactitude que l'on peut désirer, et je les regarde comme infiniment preférables à la simple inspection du crâne dont Gall se contentait toujours, ou même a la mensuration de la cavité

crânniene du cervelet, quelque exacte qu'on puisse la faire.

"Le tableau suivant contient le poids absolu, et le poids relatif, du cerveau, du cervelet, et de la moëlle allongée de quarante-trois chevaux entiers, douze juments, et vingt-un chevaux hongres."

Here follow the tables, which it is unnecessary to give in detail, but of which the following is the result: —

"La comparaison du poids relatif du cerveau et du cervelet donne ce rapport d'une manière exacte; et ces rapports sont les suivants:

"Chez les chevaux hongres

le cervelet est au cerveau comme 1 est à 5·97

Chez les juments - - comme 1 est à 6·59

Chez les étalons - - comme 1 est à 7·07

"Ainsi ce sont les étalons qui ont comparativement le cervelet le moins developpé: les juments sont mieux favorisées qu'eux sous ce rapport; et les chevaux hongres le sont plus que les uns et les autres. Si l'un des deux parties principales de l'encéphale s'est atrophiée c'est le cerveau, car il est seulement de 419 grammes, tandis que le cerveau des étalons est de 433: et si l'une d'elles s'est développée de manière a prédominer sur les autres c'est le cervelet des chevaux hongres, qui pese 70 grammes, tandis que celui des étalons et des juments n'ont pesé que 61."*

Whoever is desirous of inquiring further into the

* Anatomie comparée du Système Nerveux, tome i.

system of Gall and Spurzheim, will do well to consult the "Examen de la Phrénologie," by M. Flourens, and the "Treatise on Phrenology," in the seventh edition of the Encyclopædia Britannica, by Dr. Roget. In the former the subject is discussed on general grounds; in the latter it is still more fully considered in its details; and in both it is treated in a manner worthy of the high reputation of the respective authors.

THE END.

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PSYCHOLOGICAL INQUIRIES.

THE SECOND PART.

BEING A SERIES OF ESSAYS INTENDED TO ILLUSTRATE

SOME POINTS IN THE

PHYSICAL AND MORAL HISTORY OF MAN.

BY

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PREFACE.

In offering a Second Part of "PSYCHOLOGICAL INQUIRIES" to the notice of the public, I have no expectation that it will be found to include any record of facts which were not already known to many of my readers; nor do I doubt that those who have been in the habit of reflecting on these subjects have arrived at conclusions very similar to those at which I have arrived myself.

I have on the present occasion, as I had formerly, two objects especially in view, one of these being to show that the solution of the complicated problem relating to the condition, character, and capabilities of man is not to be attained by a reference to only one department of knowledge; that for this purpose the observations of the physiologist must be combined with those of the moral philosopher, mutually helping and correcting each other,

and that either of these alone would be insufficient.

The other object to which I have alluded is, that I would claim for researches of this kind that they should be regarded not as merely curious speculations, but as being more or less of practical importance to every individual among us, enabling us to understand to how great an extent we may contribute to the improvement of the faculties with which we are endowed, and to our own well-being in life.

If I have preserved the mode of dialogue, it is not merely because it is in conformity with the plan of the former volume, but also because it seems to be well adapted to a subject the knowledge of which is not sufficiently complete nor sufficiently well-defined to admit of it being presented in the same systematic form as that which is the foundation of some other sciences.

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ANOTHER year had passed over our heads. Crites and I, though fully occupied with the duties of our respective professions, had still found some intervals of leisure, in which our minds reverted to our conversations with Eubulus; and I believe that I may say for him, as well as for myself, that we felt that the few days which we had passed in our friend's retreat had not been, on the whole, unprofitably employed. In our daily pursuits we found much that served to illustrate our former speculations, thus giving to our practical dealings with mankind an additional and a higher interest, by connecting them with the great science of human nature. An invitation from our friend to repeat our visit was very acceptable to us, and we again willingly availed ourselves of the opportunity of exchanging for a time the "*fumum et opes strepitumque Romæ*" for the fresh air and quiet of his residence in the country.

We found Eubulus as we had left him, spending some hours in the day among his books and papers, and at other times attending to the not unimportant duties which he had created for himself among his tenants and labourers; especially endeavouring to improve the condition of the latter, not so much by dispensing charity among them (though in this he was not deficient) as by the judicious exercise of his influence, with a view to promote those habits of prudence and forethought and attention to domestic economy, the want of which in that class of society is one principal cause of the inconveniences to which they are subject.

The ornamental grounds adjoining his mansion were not very extensive, but they were laid out with considerable taste, and contained many rare and interesting specimens of the vegetable creation, collected from various regions of the earth. A splendid aloe which, after a repose of many years, was again loaded with flowers, presented a striking contrast to the dark coniferous trees, which by a skilful cultivation were made to flourish as if they

had been still in their native climates; while elsewhere a choice collection of orchidaceous plants and other exotics, under the influence of artificial heat, offered themselves as objects of interest not less to the unlearned visitor than to the scientific botanist. Eubulus did not pretend to have paid any unusual degree of attention to the subject; nevertheless he had studied it sufficiently to be able to afford us much curious information as to the economy of plants and vegetable physiology which we had not previously possessed. "Having," he said, "had my mind always a good deal occupied in other ways, I cannot pretend to have dived very deeply into these matters. Nevertheless, even the little knowledge of natural history which I have been able to obtain has been to me a source of much enjoyment since I entered on my present mode of life. In my daily excursions I am not only gratified by the beauty of the landscape, constantly varied as it is, in a hilly country, by the alternations of light and shade, of gloom and sunshine, and in another way by the harmony of rural sounds,

so different from the discords of London streets, but I find an additional source of interest in watching the development of buds and flowers, the growth of trees, the progress of plantations, the habits of birds and insects, and all that activity of animal life by which we are surrounded. I should indeed be sorry if the time were ever to arrive when the study of these things was to supersede those other studies which form, as it were, the staple of what is now considered to be the higher kind of education. I can conceive no better method of training the intellectual powers in early life than the acquiring a knowledge of the ancient languages of Greece and Italy; nor any better method of improving the taste, or furnishing the mind with graceful recollections and ennobling sentiments, than an acquaintance with the great writers of antiquity. But I do not see why these should be the exclusive studies of our schools, nor can I doubt that much good would arise from conjoining with them those other studies which relate to the phenomena of the universe. It is not to be supposed,

nor is it reasonable to expect, that every one should be a profound astronomer or chemist or naturalist; but some general knowledge of these sciences cannot fail to be useful to us all individually, besides making us more useful members of society as we advance in life."

CRITES. Admitting the force of all that you have said, yet there are circumstances which might lead me to entertain the opinions which you have expressed less confidently than I should have done otherwise. After all, how very little can the greatest amount of human knowledge on these subjects really be! To us the universe presents itself as an assemblage of heterogeneous phenomena, some of which we can reduce to laws of limited operation, while others stand by themselves, bearing no evident relation to anything besides. We may well suppose that there are in the universe Beings of a superior intelligence, and possessed of a greater range of observation, who, if I may be allowed to use such an expression, are sufficiently behind the scenes to be able to contemplate all the immense variety of material phe-

nomena as the result of one great general law impressed on all matter, and to which the whole universe is subjected. But, with our limited capacities, we are compelled to take humbler views, and to grope our way as well as we can among the changes which are taking place around us, as if the mechanical, chemical, and vital laws by which they are governed, were wholly distinct from each other. Then it may be admitted as a question whether it is a matter of course that the extension of human knowledge really leads to an extension of human happiness. Further it may be remarked that the history of science as well as of literature shows that even those who are engaged in these loftier pursuits are not altogether exempt from the frailties of human nature. There is an avarice of reputation, as there is of money; and the competitors have not always been so liberal to each other as they might have been well expected to be. Is it not also really true that there is no connexion between wisdom and knowledge; that there may be much of either one of them with very little of the other;

and that those who have the smallest amount of knowledge are not unfrequently led by their instinct to reason more accurately than some very learned persons, even than those who have studied logic as a science? Taking all this into my consideration, I am sometimes led almost to sympathize with the sentiments expressed by the Turkish Cadi in his farewell letter to Mr. Layard: "There is no wisdom equal to the belief in God. He created the world. Shall we liken ourselves unto Him, in seeking to penetrate into the mysteries of His creation? Shall we say, 'Behold how that star spinneth round that other star'? Let it go. He from whose hand it came will govern and direct it . . . If thou wilt be happy, say 'There is no God but God.' Do no evil, and then thou wilt fear neither man nor death; for surely thine hour will come."

EUBULUS. It is true that the most profound knowledge which man has been able to obtain must be very limited, compared with that which we may suppose to be within the reach of Beings of greater intelligence and power.

Yet, considering the difficulties which stand in his way, and the imperfect means placed at his disposal, it is to me marvellous that so much should have been really accomplished. Could it have been supposed, *à priori*, that a being who under certain circumstances is presented to us as a rude savage, should under other circumstances have become Aristotle or Newton? With regard to your last observations, they amount to no more than this—which I am afraid that I must admit to be true—that neither knowledge nor philosophy is in all cases sufficient to counteract the effect of human frailty. I must also admit that it is not always a pure love of knowledge that stimulates the labours of the philosopher. However sincere that love may be, I will not say that it never happens, but it certainly rarely happens, that the attainment of reputation is not one object to which he looks as the reward of his labours. How can it be otherwise? The desire of reputation,

"The last infirmity of noble mind,"

is an essential part of human nature; an

instinct implanted in us for a wise purpose, and, however it may be misdirected in some instances, productive on the whole of the greatest benefit to mankind. I fully agree with you in the opinion that there may be much of wisdom with little knowledge, and much knowledge with little wisdom; but surely you will not deny that, as a general rule, the effort to acquire knowledge tends to the improvement of the intellect, by bringing into action some of its higher faculties, which might have remained in abeyance otherwise. It may be that an increase of knowledge does not improve the judgment on the facts which are actually brought before us; but it produces an effect which is nearly equivalent, inasmuch as, by extending our observation to a greater number and variety of facts, it enables us to see further, to have broader views, and thus to arrive at more accurate conclusions. You seem to doubt whether the extension of knowledge adds to human happiness; but is it not true that the causes which tend to the shortening of human life are, with

few exceptions, such as produce either bodily pain or moral suffering, and that the average period of life is longer in civilized than in uncivilized communities? Then see how the pursuit of knowledge must necessarily operate on those who devote themselves to it; how it elevates the mind to higher views than those which are entertained by the ignorant and the lazy; how it affords worthy objects of contemplation for leisure hours, and supersedes the inclination for low pleasures and mere sensual enjoyments. While other creatures seem to be wholly occupied with the objects which are actually before them, or impelled to the pursuit of those which are more distant by the force of instinct, Man is essentially an imaginative animal. From the materials which his memory affords him, he creates, he abstracts, he makes new combinations: he strives to look into the mysteries of the past, and to lift up the veil which conceals the future. A large portion of life, even that of the dullest person, is spent in the exercise of the imagination. How much, then, must the character of each

individual depend on the circumstance of this faculty being worthily directed! I do not say that there are not other studies which will answer the purpose as well, but it cannot be denied that none will answer it better than that of the physical phenomena of the universe around us. Here, more than anywhere else, we find displayed to us that order, and those unmistakable examples of design and of the adaptation of means to ends, by which we are compelled to recognize the agency of one vast superintending Intelligence, and which constitute the sure foundation of natural theology. Here, too, the field to be explored is of unlimited extent. As we advance, the horizon which seems to bound our view recedes further and further from us. Every fresh discovery is but the beginning of a further progress, so that, the more we know, the more we find that we have yet to learn. In this department of knowledge another great advantage is offered to us, inasmuch as, in the different sections of it, the exercise of different faculties of the mind is required. In some we rely almost

wholly on simple observation; in others, observation would accomplish little without the aid of experiment; and in others still, where the phenomena are of a simpler kind, and the laws by which they are regulated more exactly determined, the mathematician is enabled to apply his marvellous science, so as to ascertain facts beyond the limits of human experience, and predict changes in the universe which may not be completed before the race of man has ceased to exist on the earth. Thus every variety of the human intellect may find in these studies its suitable employment. The discursive imagination of one, the aptitude for arrangement and classification possessed by another, and the mathematical genius of a third individual, may alike be turned to a good account; and he, who might be held to be stupid if his attention were limited to one subject, may be enabled to show that he too has his peculiar talents by directing it to another.

ERGATES. However he may have expressed himself, I do not suppose that Crites seriously intended to support the views of the

Turkish Cadi, or that he has really any doubt as to the advantages which we may individually derive from the acquirement of knowledge, both as affording us an agreeable occupation, and as tending to improve the moral as well as the intellectual character. But it does more than this. Observe the effect which the general diffusion of knowledge produces on society at large; how it draws the different classes of it into more free communication with each other; how its tendency is to make the laws more impartial, bring even the most despotic governments under the influence of public opinion, and show them that they have no real security except in the good will of the people. Knowledge goes hand-in-hand with civilization. It is necessary to the giving full effect to the precepts of the Christian faith. It was from the want of it that Galileo was tortured by the Inquisition, that Servetus was burned by Calvin, that the Huguenots were persecuted and slaughtered by Louis XIV., and that in numerous other instances one sect of Christians has conceived

it to be their duty to exterminate another. It is a misapplication of the term civilization to apply it to any form of society in which ignorance is the rule and knowledge the exception. If a Being of superior intelligence were to look down from some higher sphere on our doings here on the earth, is it to be supposed that he would regard the Duke of Buckingham, dancing at the French Court, and scattering the pearls with which his dress was ornamented, on the floor, as being really superior to an Australian savage; or that he would see in the foreign Prince, who at a later period exhibited himself at another Court with his boots glittering with diamonds, any better emblem of civilization than in the negro chief, who gratifies his vanity by strutting about in the cast-off uniform of a general officer?

But, reverting to the observations which you have just made, you must excuse me for saying that, although you disclaim the intention to do so, you have given a more prominent place to the physical sciences, as objects of inquiry, than really belongs to them. I do not mean to

express a doubt as to their great importance, or as to their answering all the purposes which you attribute to them; but it may be a question whether in these times they do not too exclusively occupy our attention, other inquiries which are not less important being comparatively neglected. I refer more especially to those which relate to the operations of the intellect, the laws of our moral sentiments, — in short, all that belongs to the one individual percipient and thinking Being, which each of us feels himself to be. These subjects, which may all be conveniently included under the name of Psychology, constitute a science quite as real as astronomy, chemistry, or natural history; inferior to none of the physical sciences in interest, and I may add in usefulness. I know of no better exercise than that which these inquiries afford for the mind itself, especially as they tend to improve in us the habit of thought and reflection, as they enable us to form a just estimate of our own powers and of the nature and limits of human knowledge; thus rendering us more competent to

pursue other inquiries, however different in their nature, with advantage. Observe that I suppose the study of mental phenomena to be properly conducted, and limited to its proper objects, without being adulterated by those wild speculations in which some have indulged, and which have given the science rather a bad reputation under the name of metaphysics.

EUBULUS. It has always happened that at one period the minds of those who observe and think have been more or less exclusively directed to one particular department of knowledge. This is as it should be; for thus by the united efforts of the many a greater progress is made in a particular science or class of sciences than would have been made otherwise. With the ancient Greeks the study of geometry and of moral philosophy in its various branches predominated, and to such an extent that little progress was made by them in the physical sciences. At the present time the latter have taken the place of more abstract speculations, and we see the result in the marvellous progress which has of late been made in unravel-

ling the mysteries of the external world. Another result, however, is that many, and perhaps the majority among us, are too much disposed to look upon the material universe as if it were all in all, and to ignore or disregard those other inquiries to which you have alluded. I, for one, do not underrate their importance, nor in any way differ from the opinion which you have expressed as to their usefulness. I believe that whoever would form a right estimate of himself and others; whoever would improve his own character; whoever aspires to the high office of ameliorating the condition of society, whether as a statesman, as a religious teacher, as the promoter of education, or in any humbler capacity, can in no other way so well qualify himself for his undertaking, whatever it may be, as by studying the laws which regulate his own mind, displayed as it is in his own perceptions, sentiments, thoughts, and volitions. This is the only true foundation of that great science which, for all practical purposes, is more important than anything besides — the science of Human Nature.

Still I cannot persuade myself that if the study of psychology, or, if you please, the moral sciences, were to prevail to the same extent as that of the physical sciences prevails at present, it would lead to any proportionate result. The latter offer to us a domain which is the same as if it were of infinite extent. Every addition to our knowledge leads to knowledge further still; and if that exercise of the imagination, which constitutes the genius of the scientific discoverer as much as it does that of the poet, be regulated by the true spirit of the Inductive philosophy, even where the hypothesis which has led us on is proved to be erroneous, a substance and reality remains, which shows that it has not been employed in vain. But it is quite different as to those studies which have for their object the phenomena and operations of the mind. Here we depend wholly, or almost wholly, on the means afforded by simple observation. The field which is open to us is of limited extent; and ere long we discover that, whatever our powers of observation may be, we can advance no

further. If we look into our own minds, up to a certain point there is as much reality as there can be in any other department of human knowledge. So we may learn a good deal as to the varieties of mind as it exists in other men, and even in the inferior animals, and may obtain some, however dim, glimpses of that great creative Intelligence which we see displayed in the order and design of the world in which we live. But we soon arrive where our knowledge ends, and, if we endeavour to overleap this boundary, we pass at once into a region of mists and shadows, where the greatest Intellects do but grope their way to no good purpose, striving to know the unknowable, and speculating on subjects beyond their reach.

ERGATES. If mental science, under the name of metaphysics, has, as I just now remarked, acquired but an indifferent reputation, it is not because the working of the mind is not as fit a subject of observation as the phenomena of the material world, but because metaphysicians have been too apt to mix up with these inquiries the discussion of others

which are beyond our capacities. What is the origin of those simple beliefs on which all our knowledge rests? — of that of the existence of the external world? — of something beyond ourselves? — of our own identity? — of the relations of cause and effect? — of the axioms of mathematics? Are these convictions, and various others which might be enumerated, forced upon us by the constitution of our own minds, or are they all resolvable into our experience; and, if so, wherefore do we believe in our experience? Philosophers have not been wanting in their attempts to answer these questions; but they have answered them in different ways, and their speculations have led to no useful or practical result. The convictions remain the same in all of us, complete and unalterable, explain them as we may. But such discussions, however tempting they may be to human curiosity, form no necessary part of the science of psychology, and only tend to injure its character and usefulness.

The fact is, that we are bound and hemmed

in not only by the want of opportunities of experience, but also by the limited nature of our faculties; and that, in this last respect, the difference between one and another department of knowledge is only in degree. One great advantage of that study of our own minds, which constitutes the foundation of psychology, is that, if properly conducted, it leads us more than anything besides to be humble in our aspirations, and not to arrogate to ourselves powers and capabilities which we do not possess. In natural philosophy, or in physiology, many questions arise which are just as incapable of solution as any of those discussed by metaphysicians. I need not advert to the speculations of Plato in the Timæus, nor to those attributed to Timæus the Locrian in the treatise on the Soul of the world, nor to the dreams of Lucretius. The Vortices of Des Cartes, the Phlogiston of Stahl, nay, even the speculations of Newton himself respecting an all-pervading ether, are all examples of human curiosity striving to pass the bounds of human knowledge. An

hypothesis which has been once admitted, and to which men's minds have become habituated, will still continue to be taken for granted, long after the slender foundation on which it originally rested has melted away from under it. The notion of an imponderable material agent, as explaining the phenomena of heat — under the name of caloric — was a mere assumption, the more remarkable as it originated with philosophers who dealt less in hypothesis and more in matter of fact than any of their predecessors in the same department of science; yet it continued to prevail long after Sir Humphry Davy, in his Elements of Chemical Philosophy, had demonstrated its fallacy. The argument of Boscovick, showing that we have no grounds for the belief in the existence of solid impenetrable molecules of matter, is unanswerable; yet that other hypothesis which he substituted for it, of mathematical points (that is, points having no dimensions, surrounded by spheres of repulsion and attraction), is even more difficult to realize than that which it was intended to displace.

The truth is, that when we attempt to enter on inquiries such as these, we find that we have arrived at the end of human knowledge, and that our speculations on such subjects as the ultimate molecules of matter, or the magnetic and electric fluids, are merely methods of bringing things which are beyond our comprehension down to the level of our capacities. They are like the x and y in algebra—with this difference, however, that in the one case, in working out the equation, we obtain the value of the unknown quantity, whereas we can arrive at no result analogous to this in the other.

EUBULUS. Yet such hypotheses answer an useful purpose. They enable us, as it were, to bridge over the space which separates the known from the unknown, and to carry our researches into other regions of facts and realities which would have been otherwise inaccessible. But their usefulness fails if we take them for more than they are worth, and forget that they do not themselves constitute knowledge, although they may be employed as

instruments to help us in obtaining it. I need scarcely add that there is nothing more essential to the success of scientific inquiry than that we should not waste our time, nor divert our attention from other objects, by speculating on things of which we neither have, nor can have, any actual experience.

ERGATES. The observations which I made were intended to go further than this. It seems to me that, independently of the question of our having or not having opportunities of experience, there are on every side of us things which the structure of our minds does not enable us to comprehend. Do you believe that, under any circumstances, we should be able to understand why it is that a stone gravitates to the earth, or the earth to the sun; or that the sun itself is influenced by the other heavenly bodies, situated at what is to us an inconceivable, though not an immeasurable, distance from it; or that we should ever advance beyond the simple fact that it is so? The same observation may be applied to magnetic attraction and repulsion, and all other

analogous agencies. Take another example. All the knowledge and reasoning which we can apply to the subject would lead us to believe that as there are no limits to space, so there are none to the material universe. Yet, if we would represent such Infinity to ourselves; if we try to conceive that, having the requisite power of locomotion, we might pass through worlds and suns, or matter in other shapes, for ever and ever, without arriving at an end, we find that even the imagination fails, and that we are lost in endeavouring to realize an idea which is beyond the reach of our capacities. Again, we recognize certain necessary truths, as, for example, that the square of the base of a right-angled triangle is equal to the squares of the two other sides. This is plain enough. But if we ask why does the Deity exist? why does anything exist? it is evident that it must be from necessity, and because it could not have been otherwise. But we can go no further. The nature of this other kind of necessity is absolutely and entirely beyond all human comprehension. Thus, as we are

restrained in one direction by the want of opportunities of experience, so we are in another by the imperfection of our own faculties; and the first thing necessary for the right acquisition of knowledge is, that we should duly recognize the limits which are thus set to our inquiries, and not be led away from that which is real and substantial by the pursuit of the shadowy and fantastic. Referring to the past history of science, it cannot but occur to us how much greater progress would have been made in all its departments, if the cultivators of it had seen their way more distinctly in this respect.

EUBULUS. It is true that what you have now mentioned is among the principal causes which have retarded the progress of science in former times. But you must admit that not only at the present day, but for the last two or three hundred years, these investigations have been on the whole very differently conducted. The objects which are attainable have been better distinguished from those which are not; it has been well understood that in

science, as in everything else, we have really nothing to do except with matters of fact, and with that classification of phenomena from which we deduce what are called the laws of Nature. No one now doubts that an exact knowledge of facts is the only basis on which the structure of science can be erected. The astronomer measures the heavens with as much care as a surveyor measures the divisions of an estate. The chemist weighs the results of his experiments with a balance which is affected by the thousandth part of a grain. The geologist, instead of pouncing at once on a Neptunian or Plutonian hypothesis, investigates the structure of different parts of the earth's crust; studies the character and position of the strata, and examines the fossil remains imbedded in them; and reviews the whole of the facts which he has thus collected, before he ventures to draw any conclusions from them.

ERGATES. You may add that even in the more complicated sciences of animal physiology and pathology, the importance of exactness as to facts, however difficult the attainment of it

may be, is not less fully appreciated than in those which you have enumerated; and if you were to make yourself acquainted with what goes on in a modern hospital with a well-conducted medical school attached to it, you would find that the mode in which investigation as to disease and the operation of remedies is carried on, is perfectly in accordance with the rules which Lord Bacon has laid down for the improvement of medical science in his treatise on the Advancement of Learning. My apology for interrupting you with this remark is, that I have met with not a few of the uneducated part of what are called the educated classes, who seem to think that medical science, especially in that department of it which relates to internal diseases, is little better than a kind of guess-work, in which if correct opinions are formed, it is rather by accident than by any strict process of observation and reasoning.

EUBULUS. I am glad to receive such a confirmation of the views which I have endeavoured to express. If there be any danger to science

in the future, it will be not from any want of precision and caution in the conduct of scientific inquiries, but quite of another kind. To love knowledge for its own sake, to find in the advancement of knowledge "its own exceeding great reward," to be impressed with the conviction that, whatever further insight may be obtained into the phenomena and laws of the vast universe around us, the ultimate, though not the immediate result, must be in some way beneficial to mankind, either by administering to their physical necessities and comforts, or by improving their intellectual and moral character,—these have been the principal inducements which have led the greatest geniuses among us, the master-spirits of the age in which they lived, to devote themselves to philosophical and scientific pursuits; and it is thus that they have earned for themselves the respect and homage of the world. Nor can it be said that it is very different from this at the present time. For, whatever worldly advantages the scientific inquirer may in some rare instances derive ultimately from his pur-

suits, the prospect of them is so distant, and so uncertain, that it can in no way enter into his calculation, or tend to divert his mind from other and more profitable undertakings. But a change is coming over us. The period has arrived when the discoveries of science, the achievements of former generations, are becoming extensively applied to the purposes of commerce, of manufactures, and the ordinary concerns of life. Then the numerous examples which have presented themselves of late years, of large fortunes rapidly accumulated, have afforded an additional stimulus (where none was wanted) to the natural desire of wealth; while the prevailing study of political economy, with all the great good which it has done, has produced this evil, that it has encouraged the disposition, in a large portion of society, to regard the increase of wealth, and the adding to our stock of luxuries and comforts, as the most important business of life. From this combination of causes it is that too many of the public are led to measure the advantages arising from the pursuit of knowledge by a

lower standard than that by which it has been measured hitherto; estimating the value of researches in science by their consequences as affecting the physical well-being of mankind, and regarding those who apply the discoveries of philosophers to some practical purpose as if they were on a level with those with whom the discoveries originated. The danger to which I allude is, that the cultivators of science might themselves be led to participate in these utilitarian views. If it should be so, science must undoubtedly descend from the high station which it at present occupies. Nor can this happen without great injury to the cause of knowledge itself. The mere utilitarian philosopher, having his views limited to some immediate practical result, will be like the alchemists of old, as to whom Lord Bacon has observed that "assuredly the search and stir to make gold brought to light a great number of good and fruitful inventions and experiments, as well for the disclosing of Nature as for the use of man's life;" but who, if they had continued their labours to the end of time, would

have been no more cognizant of the laws of Nature than they were in the beginning. Eventually, even as to their gross material interests, society would be a loser. The sailor, pursuing his course over the trackless ocean, would never have had placed at his disposal the means of ascertaining the longitude, if philosophers, without reference to this object, had not studied mathematics and the laws of planetary motion; nor would London and Paris have ever been placed, as they now are, in instantaneous communication with each other, if those who began with the simple fact of the muscles of a frog's leg being made to contract by the contact of certain metals, had not pursued these inquiries until they reached the laws of voltaic electricity, never dreaming of the great invention which was ultimately to rise out of these researches in the shape of the electric telegraph. How many analogous instances might not be adduced, sufficient to satisfy the most thorough-going utilitarian that there are none who really contribute so much to the attainment of the objects which he him-

self has in view, as those who pursue science for its own sake, without reference to the practical results to which it may lead ultimately!

THE SECOND DIALOGUE.

Importance of Self-Knowledge.—Necessity of Physical Power to great Intellectual Exertion.—The distinctive Character of Man, his Capability of Improvement.—Exercise the principal Source of Improvement of both the Physical and the Mental Faculties.—One Sense supplies the Deficiency of another.—Illustrations of this Rule.—The Influence of Education in placing the other Conditions of the Mind under Subjection to the Will.—Various Illustrations of the Phenomena and Laws of Memory.—Artificial Aids to Memory.—Peculiar Memories.—Connexion of the Imagination with Memory.—Importance of the Imagination.—The Judgment more improved by the Prosecution of the Inductive than by that of the Deductive Sciences.—Perfection of different Faculties in different Individuals, the Excellence of one supplying the Deficiency of another.—Patience, Diligence, and Perseverance.—Influence of Conversation on the Development of the Mental Faculties, but Habits of Reflection best acquired at other Times.

It was on the morning after our last conversation that Crites thus addressed Eubulus:—

"When you took leave of us last year, referring to the duties which we owe to society

and ourselves, you observed that 'no one can perform them properly who does not regard his own powers, his own disposition, and his peculiar moral temperament, influenced as it may be by his physical condition and his mode of life, as a fit object of study, as much as anything external to himself.' Now, agreeing with you in this opinion, it appears to me that this is a lesson which cannot be learned too early in life; and that the teaching it is a duty to the performance of which the attention of those to whom the business of education is intrusted should be especially directed."

EUBULUS. I suspect that it would be dangerous to lay down any express rule for young people, that they should look into and study their own characters; and that it would lead at least as often to self-conceit as it would to humility. But a judicious parent or a judicious tutor may accomplish the same object by other means, by availing himself of accidental opportunities of training the mind of his child or pupil in a right direction. In the observations to which you refer, I had in view chiefly those

who are so far advanced in life that they may be expected to educate themselves; and it is then, and then only, when the lesson is forced upon us by the rough usage of the world, that it will be effectually learned. I need not repeat what moralists have so often told us, as to the necessity of correcting our propensities to evil and encouraging our propensities to good. But surely it is important that individually we should also do what we can towards the improvement of our intellectual faculties; and these are so bound up with our bodily condition, that we cannot, with any advantage, direct our attention to the one while we disregard the other. Each individual must study his own case. Habits of life in which one may indulge with apparent impunity, may be injurious to the intellect of another. What any of us may be able to accomplish, depends, in a great degree, on the extent of our physical powers. There are many who have attained the highest academic honours, and have been enabled immediately afterwards to enter, with all the energy required, into the active business

of life, simply because the attainment of those honours was to them a comparatively easy task. But there are many others who have attained the same object with difficulty, and whose powers had been thereby so far exhausted as to render them incapable of any great undertakings afterwards.

ERGATES. It is a general law of the animal economy, that when the vital powers are from any cause depressed below a certain point, they are not easily, and sometimes are never, repaired. I have known persons who were otherwise healthy suffer from the effect of a large loss of blood for some years afterwards; and there are numerous instances of those who for a limited time have been subjected to great hardships and privations, who have never regained their former condition. In this age of keen competition, there are not a few who suffer from too great mental, as there are others who suffer from too great bodily labour, and who would accomplish greater things in the end if their exertions were more limited. In the way of illustration, I might, if I were so

disposed, refer to instances both of professional men and of politicians who apparently from this cause have broken down in the middle of what appeared to be a noble and prosperous career. Much more might be said on the subject; but after all there is one simple rule, the observation of which is in itself sufficient: to make the most of the intellectual powers, the animal system should be maintained in a state approaching as nearly as possible to that of perfect health; and all those habits, whatever they may be, which tend in any degree to derange the animal functions, should be scrupulously avoided.

EUBULUS. There is, however, no necessary connexion between robust health and superior intelligence. How often do we see the former combined with stupidity and ignorance! Travellers report to us instances of tribes of savages who intellectually appear not to be many degrees superior to the lower animals. The same may be said of the poor deserted children who have been sometimes found leading a lonely life and maintaining a pre-

carious existence in forests, apart from all human society. In his rude and uncultivated state, there is little in man either to respect or admire. That by which he is distinguished, and which elevates him above all other creatures on earth, is his capability of improvement. The observation applies to individuals not less than it does to societies of men. Of two individuals, with perhaps equal capacities of mind, but placed under different circumstances as to education and as to the class of persons with whom they associate in early life, one may be found, after a lapse of years, to be comparatively stupid, while the other, as to intelligence, far surpasses what had been anticipated of him in the beginning.

CRITES. But here the question arises, "Are all our faculties alike capable of improvement? and if it be so, is the same method of treatment which is applicable to one of them applicable to all the rest?"

EUBULUS. For all practical purposes it may be sufficient to lay it down as a rule that the faculties of the mind generally, like those

of the body, are strengthened by exercise. To give an explicit answer to your question, however, we must consider the subject more in detail; and probably the prudent course will be to begin where our knowledge begins, that is, with the organs of sense. But, instead of entering upon it myself, I would rather refer you to Ergates, whose opinion on this, as on many other subjects, is more valuable than mine.

ERGATES. I really have little more to say respecting it than may have occurred to any one else. It may indeed be almost resolved into this simple rule: that our senses admit of being improved by cultivation as much as those higher faculties to which they are subservient. The sailor distinguishes a ship in the horizon which is imperceptible to the landsman. The practised musician has a nicer perception of musical sounds, of harmonies and discords, than the inexperienced artist. The painter who has become a master of his art recognizes effects of shades and colours, and a multitude of things besides, of which he took no cognizance at all when he first entered

on his profession as a student. So also the water-drinking Hindoo finds a difference of taste in the waters of different springs, which are alike insipid to the drinkers of beer or wine; and the worker in jewelry and gold ornaments acquires a nicety of touch of which the blacksmith can form no conception. It is, however, in those cases in which a particular sense has never existed, or has been permanently destroyed, that we learn to how great an extent other senses may be improved so as to supply the deficiency. In the earlier part of my life I made acquaintance with a blind fiddler, who wandered about the country by himself, attending village festivals; and I remember, among many other things which I have now forgotten, his having described to me how certain feelings, produced, as he supposed them to be, by the pressure of the air, made him understand that he was close to a large tree. Children who have been born blind, or who have become blind, learn to read with their fingers, by means of small embossed characters, in a shorter space of time than those who have

their sight do by printed books. They become as familiar with the voices of their acquaintance as others are with their countenances; and it is really true that they not unfrequently wonder why, from being born blind, they should be held to be objects of commiseration.

I remember seeing a little girl three or four years old, who had been totally deaf from the time of her birth, watching her mother as she was speaking. The intensely earnest and anxious expression of her countenance when she was thus occupied was almost painful to behold; but the result was, that by a close attention to the motions of the lips, and, as I presume, by observing those smaller movements of the features which are unnoticed by others, she was enabled to obtain a competent knowledge, not indeed of what her mother said, but of what she meant to say. Examples of this kind may be supplied without end. There are few professions, and few pursuits in life, which do not require that some one organ of sense should be in a state of greater perfection than the rest; and each individual accordingly trains and edu-

cates that of which he is most in need, though he himself is unconscious that he is doing so.

The organs of sense are as much physical machines as the telescope, or the microscope, or the ear-trumpet; and in like manner, as the muscles become more developed, more vascular, and larger by being exercised, so it is not improbable some such actual changes take place in the organs of sense also, rendering them more adapted to the purposes for which they are designed. But this does not explain the whole. Any one who enters on the study of minute anatomy, or what they are pleased to call *histology* (we are very fond in these times of inventing new names for old things), by means of the microscope, is at first very awkward in the use of the instrument. By degrees he understands it better, and is enabled to see what he could not see, or at any rate did not comprehend, in the beginning. So it is with regard to the organs of sense. We are clumsy in applying them to a new purpose, as we may be clumsy in our first attempts with an optical machine, but by diligence and attention we

become more dexterous. What I am about to mention is no rare occurrence, and will serve to explain what I believe to be the correct view of the subject. A gentleman, who heard perfectly well with one ear, was thoroughly convinced that he had been entirely deaf with the other ear from the time of his being a child. Bye-and-bye he became affected with a severe inflammation of the sound ear, and, when this had subsided, he discovered to his dismay that he had become quite deaf on this side also. After some time, however, on his being compelled to make a trial of what he called his deaf ear, he found that it was not really so useless as he had supposed it to be. By constant attention to the neglected organ, his capability of hearing with it gradually increased, and to such an extent that, with the help of an ear-trumpet, he could hear sufficiently well for the purposes of conversation.

CRITES. Still you seem to be of the opinion that the more constant and more exact use of the ear, or the eye, or of the organ of

touch, may ultimately lead to some actual physical change in their condition; and it being so, I do not see that you can well avoid the conclusion, that the greater development of any one of the mental faculties may be attended with some corresponding change in the organization of those parts of the brain which are subservient to it.

ERGATES. Indeed, I admitted what amounts to nearly the same thing when we were discussing the subject of the generation of new instincts last year. But what these changes are we have no means of knowing, neither can we form the smallest conception of them, so that our only safe way is to disregard them altogether. To extend the inquiry in this direction, or otherwise than as a branch of intellectual or moral philosophy, would be a hopeless undertaking.

I have told you what occurs to me as to the mode in which we learn to make a better use of the organs of sense. But I am aware that this goes very little way towards explaining the process of improvement as to the higher

faculties. What is the nature of that process? Is it the same in all cases? or is one faculty to be improved in one way, and another in another way?

EUBULUS. Excuse me if I interrupt you by offering an observation in illustration of the questions which you have just proposed. In the account of one of Captain Cook's voyages of discovery in the Pacific Ocean, it is stated that nothing was more remarkable in the untutored islanders of that region than the rapidity with which they passed from one state of even violent emotion to another, as from joy to grief, or from anger to kindness. The fact is, that those states of mind which constitute the emotions and passions are all capable of being influenced by the will. We may give way to them, we may contend against them, we may by an effort of the will prolong or shorten their duration; and accordingly as we habituate ourselves to make the necessary effort, so does our dominion over them become more complete. This is the first moral duty which a good education imposes on us in child-

hood. It is the lesson taught us by the sermon on the Mount, and by the best heathen moralists. It is the basis on which civilization rests; and if the highest civilization in this respect falls far short of our ideal standard of what it ought to be, it is not because the principle is erroneous, but because man is imperfect. Now that which is true as to those mental conditions to which I have just adverted, is also true as to some of those which we class under the head of "intellectual faculties." The objects presented by the imagination are not summoned before us by any voluntary effort. Their presence, their absence, the order in which they appear, are independent of any direct influence which we have over them. Nevertheless, when they are brought before us, we can arrest them in their progress; we can look at them on every side, so that all their various relations shall be gradually presented to our view; and we can dismiss them when we please. All this is done by an effort of the will; and in proportion as we accustom ourselves to make it, so does that

effort become more easy, and our dominion over the imagination more complete.

The power of continued attention differs very much in different individuals, according to the original construction of their respective minds. Thus in the case of two boys, apparently under similar circumstances, we may find one of them to have great difficulty in fixing his attention long enough to enable him to understand the simplest proposition in geometry, while the other accomplishes the same thing with no difficulty at all. But here also the defect under which the one labours may be in a great degree supplied by education and practice, while the advantage which the other naturally possesses may be lost by neglect. A young man who has not been trained to gain knowledge by reading, will complain that, after he has read a few pages, his mind becomes bewildered, and he can read no longer; and I have known even those who have been well educated originally to make the same complaint, when, from being constantly engaged in the active pursuits of life, they have

for many years neglected the habit of reading. On the other hand, the boy who is supposed to have *no head for mathematics* may by constant practice become a competent mathematician. It is the same in this case as in that of the imagination. The mind is kept fixed on one object, or succession of objects, by an effort of the will; and the more we are habituated to make the effort, the more easy it becomes to make it.

CRITES. Of course it is the same as to our other mental faculties — the memory for example. A bad memory may be strengthened by exercise, and the best memory may be impaired by neglect.

EUBULUS. I do not know that this is a matter of course, though I admit that what you say is true to a certain extent. As Dr. Hooke has observed, to remember anything an effort of attention is required; and as the habit of attention may be improved by exercise, so may the memory also. But it is only an indirect influence that the will possesses over this wondrous faculty. Observe what happens with regard to an individual act of

memory. We cannot remember an event, or anything else, simply by willing to do so; for to know what we wish to remember is, in fact, to remember it already. Take a particular example. You desire to recollect the author of a poem: you keep the subject before your mind until, by what is called the association of ideas or suggestion, some circumstances connected with it present themselves to you, such as the book in which you formerly read the poem in question, the place in which you were at the time, or the individual who quoted it, until at last the name of the author flashes suddenly upon you. Perhaps this may not happen until a long time afterwards, and when you least expect it. On some occasion formerly, two Latin lines recurred to my memory, of which I tried in vain to recollect the writer, or where I had seen them. I searched for them in various authors, and made inquiries of some of my friends, but without success. It was not until after the lapse of some five or six years that some accidental circumstance all at once reminded me that they were in a manuscript

prize poem which had been lent to me to read, and which I had had in my possession only for a single evening, at least twenty years ago. Instances similar to this must be familiar to all of us.

It has happened to me (and I dare say that the same thing has happened to you) to have circumstances which had occurred when I was a boy, and which it might be supposed that I had entirely forgotten, present themselves to me again in a dream. The vagaries of our memory during sleep are indeed very remarkable: it seems to deal with things and events that have long since passed away, much more than it does with those which have occurred lately; and this is more especially the case as we advance in life.

ERGATES. What you have now mentioned may probably be explained by the well-known fact that the impressions made on the mind in early life are stronger and more lasting than those which are made afterwards. But there are other things connected with the memory which are not to be explained so easily. Take

this for example. It has often occurred to myself, and I know that it has to others also, when some new event has taken place, to have a strong impression that the same thing has happened before, although I know that it is not and cannot be so in reality. If I am not mistaken, it was held by Plato that this is neither more nor less than some partial reminiscence of a former life.

EUBULUS. It seems to me that the circumstance to which you have alluded admits of a much more reasonable solution than that offered by the Athenian philosopher. Is it not the case that on these occasions there is always an actual revival of some impression made on the mind formerly, though the events in connexion with it have escaped from our memory? You will, I am sure, not think that I make too great a demand on your attention if I read to you an extract from a letter which I have received from a very intelligent correspondent, which throws great light on the subject, and which seems fully to confirm the opinion which I have ventured to express:—

"When I was about fifteen years of age I went, with my father and mother and other friends, on a tour through Somersetshire; and having arrived at Wellington, where I had certainly never been before, we tarried an hour or two at the 'Squirrel' Inn for refreshments. On entering the room where the rest of the party were assembled, I found myself suddenly surprised and pursued by a pack of strange, shadowy, infantile images, too vague to be called recollections, too distinct and persevering to be dismissed as phantasms. Whichever way I turned my eyes, faint and imperfect pictures of persons once familiar to my childhood, and feeble outlines of events long passed away, came crowding around me and vanishing again in rapid and fitful succession. A wild reverie of early childhood, half illusion, half reality, seized me, for which I could not possibly account; and when I attempted to fix and examine any one of the images, it fled like a phantom from my grasp, and was immediately succeeded by another equally confused and volatile. I felt assured that all this was not a

mere trick of the imagination. It seemed to me rather that enfeebled memory was, by some sudden impulse, set actively at work, endeavouring to recall the forms of past realities, long overlaid and almost lost behind the throng of subsequent events. My uneasiness was noticed by my mother; and when I had described my sensations, the whole mystery was speedily solved by the discovery that the pattern of the wall-paper in the room where we were seated was exactly similar to that of my nursery at Paddington, which I had never seen since I was between four and five years of age. I did not immediately remember the paper, but I was soon satisfied that it was indeed the medium of association through which all those ill-defined, half-faded forms had travelled up to light; my nurse and nursery events associated with that paper pattern being, after all, but very faintly pictured on the field of my remembrance." *

CRITES. I do not complain of this digres-

* For this interesting communication, the author is indebted to the kindness of the Reverend Thomas Bacon, Rector of Kingsworthy, Hants.

sion, which relates to a question which has often excited my curiosity. But you must excuse me if I revert to a former part of our conversation, the subject of which is far from being exhausted.

If the memory cannot be improved in one way, it may be in another. I refer especially to the various methods which have been proposed of artificial memory, and to some of which I myself frequently have recourse with advantage.

EUBULUS. It is not very correct to say that these methods improve the memory. The more proper expression would be that they help it on special occasions, which is quite a different thing.

> "Thirty days hath September,
> April, June, and November,
> February has twenty-eight alone,
> And all the rest have thirty-one;
> But leap-year, coming once in four,
> Gives to February one day more."

Here the rhythm of six lines enables us to recall to our minds thirteen facts, which, having no connexion with any general rule,

we might not easily remember otherwise. In the same manner the *memoria technica* of Gray enables us not to remember but to find out dates when we want them. Dr. Wallis *, who nearly two centuries ago was professor of geometry at Oxford, attained the power of making arithmetical calculations, "without the assistance of pen and ink, or aught equivalent thereunto," to such an extent, that he extracted the square root of three down to twenty places of decimals. We must indeed suppose him to have had originally some peculiar aptitude for such calculations; but he describes himself to have acquired it by practising at night and in the dark, when there was nothing to be seen, and nothing to be heard, that could disturb his attention. Dr. Wallis's communication to the Royal Society on this subject contains much curious information; and it is well worth your while to refer to it, when you have the opportunity of doing so.

* Philosophical Transactions, vol. xv. p. 1269.

Some years ago an ingenious person, who called himself the "Professor Von Feinagle," delivered some lectures at the Royal Institution on a system of artificial memory which he had invented, and which seems in some instances to have led to some very remarkable results. The process was too complicated for me to trouble you with an account of it; it was moreover too laborious to be practically useful, and it is no matter of wonder that it should be now forgotten. The fact is (as I said before) that such artificial contrivances as this was, do not really improve the memory, any more than the telescope which enables us to see distant objects improves the sight, or an ear-trumpet improves the sense of hearing.

ERGATES. In the course of our conversations last year, I mentioned several facts which seem to show that there is some kind of connexion between the function of memory and the organization of the brain; and it is easy to suppose that as in some persons there is a more delicate structure of the nerves of hearing, enabling them to have a nicer percep-

tion of musical sounds than is possessed by others, so there may be a difference in the organization of that part of the brain which is in some way or other subservient to the memory, accounting for the great difference as to the degree of perfection in which we find this faculty to exist in different individuals.

EUBULUS. However that may be, and admitting that the memory may be improved by use and damaged by neglect, it is plain that there is a vast original difference in the power of memory in different persons. A Spanish theologian, Francis Suarez, is reported to have been able to repeat the whole of the voluminous works of St. Augustine by heart; while Montaigne speaks of his own memory as being so bad that he ought to be celebrated for its imperfection — at the same time consoling himself with the reflection that therefore he never could venture to tell lies. Then there are different kinds of memory. One person has no memory for names or other insulated facts, while he remembers with the greatest ease whatever can be referred to a

general rule; in another it is just the reverse. Jedédiah Buxton had a vast memory for figures; another finds it difficult to cast up even a few figures in a simple lesson in arithmetic. It may be said that all these differences may be resolved into the different degree of attention which, according to our respective inclinations and tastes, we bestow on different subjects. But this is not all; for you will repeatedly see one person who remembers things with what may be regarded as a moderate effort of attention, while another fails though he take the greatest pains to do so.

CRITES. I know that Montaigne complains on more than one occasion of his want of memory, and indeed, according to his own account of himself, it must in some respects have been bad enough. He says, "I must have three hours to learn three verses;" and again, "If any one would propose anything to me, he must do it by parcels, for to answer a speech consisting of several heads I am not able." But the truth is, that his must have been an

instance, similar to those which you have mentioned, of a person having a memory for one thing and not for another. The multitude of apposite quotations which he has made from books, and the variety of facts referred to in his essays, show that he possessed one kind of memory at least in great perfection, however much he may have been deficient in other kinds.

Do you believe that any one can accomplish any great things in this world, whether it be in general literature, in science, in politics, or in the ordinary affairs of life, whose memory is defective?

EUBULUS. There can be but one answer to your question. In proportion as the memory is defective, so do we lose the advantage which we should otherwise derive from our experience of the past, of that knowledge by which alone we are enabled to anticipate the future. With an imperfect memory there must be but a scanty imagination, the images presented by the latter being altogether supplied from the stores already accumulated in the mind. The materials are the same, the only difference

being, that in the two cases they are differently combined. I need not expatiate on the important place which the imagination occupies in all our intellectual operations; it may, indeed, well be regarded as the most important, as it is probably almost the peculiar, attribute of man. We are indebted to it for the greatest discoveries in science, the greatest improvements in the arts; without it, no one can arrive at excellence as a statesman, or as the commander of armies, any more than as a poet or the writer of romances. Observe that I speak of a well-regulated imagination, which is kept in subjection to the judgment; and not that wild imagination which is allowed to wander without control, and which leads to nothing but folly and mischief.

Returning to the subject of memory, I may observe that as there are different kinds of memory, so these are of very different degrees of value. Jedediah Buxton's memory of figures ended where it began. Dr. Wallis would have been just as great a mathematician if he had never performed those arithmetical exploits

which I just now mentioned. He could have accomplished the same thing quite as well with a pencil and paper, and with a less expenditure of nervous force. If it be really true that the Spanish theologian knew all St. Augustine's works by heart, it does not appear that this was ever productive of any real good either to himself or to any one else. I did not myself know the individual; but I have been informed, on what I believe to be very good authority, of an instance of a young man who, after once or twice reading it, could repeat a rather long ballad, and yet, when he had done so, did not know the meaning of it. The memory which really leads to great results is that which is founded not on mere juxtaposition, but on the relations which objects and events have to each other: one suggesting another, so that they present themselves not as insulated facts, but as parts of a whole. It is this kind of memory which distinguishes the philosophical historian from the dry narrator of wars, and treaties, and party politics; which opens to the view of the scientific inquirer

those resemblances and analogies by means of which he is enabled, in the midst of apparent confusion and complexity, to trace simplicity and order, and to arrive at a knowledge of the general laws which govern the phenomena of the universe; and which leads those whose genius takes another course "to find in poetry its own exceeding great reward," or "to look for the good and the beautiful in everything around them;" at the same time that they become the benefactors of mankind, by transmitting wise thoughts and noble sentiments to the generations which come after them.

CRITES. You may add — or rather the fact is included in what you have just now stated — that it is this kind of memory which affords the greatest help to the reasoning powers and the judgment, by giving us a broader view of the thing before us, and thus qualifying us for a more efficient exercise of these intellectual processes. But is not this in contradiction to the opinion which you expressed formerly, that the undisciplined mind reasons and judges not less

accurately than that which has been the most highly cultivated?

EUBULUS. It is not at all so if it be true, and I cannot doubt it being so, that the kind of memory which each of us possesses is a natural gift, and admitting of being influenced only to a very limited extent by any special education or training. I said that there might be little knowledge with much wisdom, and little wisdom with much knowledge, and that a child or a peasant may reason as accurately on the facts which he actually knows and comprehends, as those who have made it their business to study logic as a science; and I say so still. In the Exact sciences there is only one side to each question, and those who comprehend the data are inevitably led to one and the same conclusion, while those who do not comprehend them arrive at no conclusion at all. In the Inductive sciences, and in the ordinary affairs of life, the case is different. Here our judgment is to be founded on a comparison of the evidence on one side with the evidence on the other; and some minds are so

constructed that they do this readily and at once, while other minds, having a more limited range, do so with difficulty or not at all, so that they seem to be scarcely capable of seeing both sides of a question. The investigation of the laws of reasoning is an important branch of philosophy; but in practice you will find that the ablest reasoners are those who follow their instinct, without reference to any of the rules laid down by logicians. The advantage afforded by a larger amount of knowledge on any given subject, is, not that it enables you to reason better, but that it gives you more sufficient data for the purpose. At the same time I admit that in this, as in other matters, the effect of practice is to make us more perfect. In other words, we may profit by experience, and learn, from every blunder which we make by drawing our conclusions too hastily, to be more circumspect and cautious afterwards.

The intellectual not less than the moral character of individuals is formed by a variety of circumstances. In some one faculty, in

others another faculty, exists in greater perfection than the rest; and as, on the one hand, any one of them may run to waste if neglected, so, on the other hand, it may be improved by exercise, especially during the early period of life. Much depends on early education, on the knowledge and the kind of knowledge which we have acquired, on the society in which we live, on our habits and worldly pursuits. One man may be stimulated by necessity, another by ambition, to make the most of the faculties, whatever they may be, which God has given him; another may have no such inducement to exertion; and hence it often happens that he of whom in early life a great deal is expected, is soon left behind in the race by another, of whom there had been no such sanguine anticipations.

You can form no real measure of the intellect by what appears on the surface. The most fluent speaker may be good for nothing else. Neither can you do so by observing the perfection or imperfection of a single faculty, for the excellence of one may compensate the

deficiency of another. One man may have a greater capacity for long-continued attention, and for the acquirement of knowledge; another, who is his inferior in this respect, may nevertheless have the advantage over him by being endowed with a more keen and rapid perception and a greater capability of independent thought. We see those who devote themselves to books, and remember all that they have read, and others who have little disposition, and even find it difficult, to acquire knowledge in this manner, but who obtain the same result by observing and studying things themselves. The latter may indeed have a smaller amount of information, but they have a more real and substantial, and a more enduring knowledge. The intellectual powers may be above the average, and yet be exercised to little purpose, because the possessor of them, either from a want of self-knowledge or from the force of circumstances, is not in the place for which he is qualified. What would Cromwell have been if he had remained a brewer? or Moreau, if the revolutionary convulsion had not raised him

from being a small attorney to be the commander of armies?

CRITES. You say nothing of the minor qualities of patience, diligence, and perseverance, which nevertheless play no unimportant part in all human pursuits.

EUBULUS. Do not call these the minor qualities; it seems to me that there are none really more important. They rarely exist except in combination with the higher order of intellect. Great things are accomplished only by those who, confident in their own powers, view the far-distant object with a strong determination to attain it, and persevere in their efforts in spite of difficulties and disappointments.

"Pater ipse colendi
Haud facilem esse viam voluit; primusque per artem
Movit agros, curis acuens mortalia corda."

The application of this rule is not limited to agriculture. Let no one persuade himself into the belief that he is to be carried forward by what he may be pleased to call "the force of genius." The most retentive memory, the quickest perception, nay, even the soundest

judgment, will of themselves lead to no grand results. For these not only is labour required, but it must be persevering labour, not diverted from one object to another by caprice or the love of novelty, but steadily pursuing its course amid failures and disappointments. In fact, if there be anything which deserves the name of genius, those which you have rather incautiously designated as minor qualities are an essential part of it. Without them there would have been no advancement in Science, no improvement in Art; or, to express what I mean to say in a few words, there would have been nothing of what constitutes the higher form of civilization.

There is one other quality not less essential than those of which I have just been speaking. For this I can find no other English name than that of humility; though that does not exactly express my meaning. It is that quality which leads a man to look into himself, to find out his own deficiencies and endeavour to correct them, to doubt his own observations until they are carefully verified, to doubt also his own con-

clusions until he has looked at them on every side, and considered all that has been urged, or that might be urged, in opposition to them. It is such habits as these which lead to the highest distinction, for they lead to a knowledge of the truth and to self-improvement. There is no other foundation for a just self-confidence. In this sense of the word the greatest men are humble. They may be proud — they are sometimes even vain; but they are never conceited. Self-conceit belongs to the smaller intellects,—to those who, having in reality some dim perception of their own incapacity, derive consolation from comparing themselves, not with their superiors, nor even with their equals, but with those who are their own inferiors.

Although I fear that you are already wearied by my thus propounding to you my own notions, and that you may with good reason be ready to say "We knew all this before," yet I am tempted to tax your patience for a few moments more. There is a passage which occurs somewhere in the writings of Miss Martineau, though I cannot tell you exactly

where to find it, which deserves the attention of those who wish to make the best use of their intellect. I do not remember the precise words, but they are to this effect, that it is important that whoever is engaged in the active pursuits of life should have a certain portion of the day in which he may be alone, in order that he may have the opportunity of communing in private with himself. In conversation with others our perceptions are rendered more acute; the mind works more rapidly; new views of things, even of those with which we are most familiar, present themselves as if it were by magic. They may be right or wrong, but they satisfy us at the time, as they help us in our argument. All this is good in its way, and we know that those whose minds have not been accustomed to be brought into collision with the minds of others are apt to become stupid, and (as in the case of long-continued solitary confinement) even idiotic. But, to turn what we gain from conversation to the best account, we require that there should be intervals in which our ideas may flow un-

interruptedly, without being diverted in their course by the remarks of others. It is in such intervals that we best learn to think. I know not what may be the experience of others, but I acknowledge that in these ways I have not unfrequently derived an ample compensation for the wearisome hours of a sleepless night. Not only are hours of relaxation truly as necessary a part of education as hours of study, but I will go further than this, convinced as I am that, if we could unravel the whole chain of causes and effects, we should find that it has often happened that, in the solitary rambles of a pensive boy, the foundation has been laid of noble thoughts and great undertakings in the after-periods of his life. It is stated in the life of Sir Walter Scott that it was while he was a sickly boy, residing for the benefit of his health in a farm-house, some of those visions passed before his mind which in the after-part of his life assumed a more substantial form, and delighted the world in the pages of "Waverley" and "Old Mortality."

THE THIRD DIALOGUE.

Influence of External Circumstances on the Condition of the Mind.—To be counteracted in a great Degree by Voluntary Effort.—Exercise of the Intellect necessary to its Healthy Condition, and conducive to Happiness and Bodily Health.—Formation of Individual Character.—Free-will and Necessity.—Baron Alderson.—Nervous Force expended in one Way cannot be expended in another.—Emotions and Passions.—The Intellect and Emotions Necessary Parts of the same System.—State of Mind very much dependent on that of the Circulating Blood.—This Rule variously illustrated.—Man being a Gregarious Animal, his Relations to others cannot be overlooked.—Cheerfulness of the Mind dependent on the Animal Functions being properly performed.—However important the Mental Faculties may be in one Way, the Corporeal Faculties are not less important in another.—Dangers to Society if the latter were to be deteriorated.

It was a bright morning in the early part of August. A thunderstorm on the preceding evening had cooled the atmosphere, refreshed the plants in the flower-beds, and moistened the earth which had been parched by the previous heat. The sun, still far below the meridian, with a few light clouds occasionally

passing over it, rendered the air of an agreeable temperature. After breakfast we had strolled into the garden, and for some time it seemed that we had little leisure for conversation. At last our meditations were thus interrupted by Crites:—"You have told us how our faculties are to be improved by cultivation—how the power of attention may be weakened by neglect and strengthened by exercise—how great things may be accomplished by the bold use of the imagination, restrained at the same time within its just limits by the reason and the judgment—how much we may individually do to make or mar ourselves; and far be it from me to deny what you have said on these subjects. Still I am constantly and forcibly reminded of the great extent to which we are dependent on things external to ourselves, over which we have no control. Cooped up in my chambers during a London fog, with a headache produced by breathing a mixture of smoke and moisture, I am quite a different being from what I feel myself to be on an occasion like the present. In the one case, exertion is a painful effort;

my mind works slowly; I sit down to my task with no willing spirit. But here, breathing the pure air, with a cheerful scene around me, my thoughts flow with ease, and the exercise of my faculties, so far from being a trial, is in itself a source of content and happiness.

EUBULUS. In what you have now said you have only given us another instance of a fact as to the reality of which we are all agreed, namely, that the state of the mind, whether as regards the moral feelings or the intellect, is to a very great extent subjected to the influence of physical causes. But allow me to ask you this question. When you emerge from your chambers, under the oppression which you have described, and enter the Court of Chancery with an important case submitted to your care, do you really find yourself less capable of paying to it the necessary attention, or that you do less justice to your client, than if the air were clear, and the sun were to shine in brightly at the windows?

CRITES. I must acknowledge that, however unwilling I may be to enter on it in the first instance, when once I have become fairly en-

gaged in the work which I have to do, my previous state of mind makes but little difference. I am not aware that I am less ready in the use of my memory, or that my attention is less complete, or that my perceptions are less acute than the occasion requires.

ERGATES. Eubulus's question sufficiently explains what is passing in his mind, and your answer to it confirms the opinion which he has intended to express. Indeed, no one, until he has been, as it were, compelled to make the necessary effort, can be aware to how great an extent the power of self-control is within our reach. It is not much to say that one whose state of health renders him fretful and peevish in his own family, may show no signs of his irritable temper when in the society of those with whom he is less intimately acquainted. On much greater occasions than this, the well-trained mind will come forth triumphant from a contest with the physical infirmities of our nature. A barrister of my acquaintance, who afterwards rose to the highest honours of his profession,

was subject to a neuralgic disease, which so affected him that it often happened, when he had to advocate an important cause, that he entered the court in a state of most intense bodily suffering. But his sense of duty was greater than his sense of pain, and the latter was almost forgotten as long as the necessity for exertion lasted. The famous Cheselden, who at the same time that he was a man of science was also the most distinguished operating surgeon of the age in which he lived, thus graphically describes the feelings with which he had to contend :—" If I have any reputation in this way, I have earned it dearly, for no one ever endured more anxiety and sickness before an operation; yet, from the time I began to operate, all uneasiness ceased. And if I have had better success than some others, I do not impute it to more knowledge, but to the happiness of a mind that was never ruffled or disconcerted, and a hand that never trembled during any operation." * The commander of

* Cheselden's Anatomy, 1740, page 333.

a merchant-vessel laboured under a frightful local disease, of which it is unnecessary for me to describe the particulars. On his voyage homeward he was overtaken by a storm, during which it required the utmost energy and skill to preserve his vessel and its crew. For two or three successive days and nights he was constantly on the deck, watching everything and directing everything, as if he had been in the most perfect health. Then the storm subsided; he was again conscious of the sufferings occasioned by his complaint, and he returned home to die. In one of our former conversations, I referred to an observation of Lord Chesterfield's, that many a battle had been lost because the general had a fit of indigestion; and I presume that this may have been true as to such a Sybarite as Vendôme is represented to have been, but I cannot believe it to be at all applicable to great officers, such as Napoleon, Nelson, or Wellington.

Eubulus. We have entered on an important chapter in the history of human nature.

If to have such a dominion over ourselves as that which you have described be necessary for great achievements, it is not less necessary to individual happiness; and well is it for those who are compelled to exercise it by the circumstances in which they are placed. The necessity of exertion withdraws our attention from the minor, and, within certain limits, even from the greater evils to which we are liable. In having to contend with difficulties, we learn to overcome them, and thus are enabled to obtain one of the highest gratifications which life affords. Nor let us overlook the fact that the exercise of the intellect, if it be applied to a worthy purpose, is not less conducive to a healthy state of mind than that of the muscles is to a healthy state of the body; and that it is in itself a source of satisfaction and content beyond any that belongs to the indolent and the lazy. Compare those who, from the duties which belong to their situation, or from their own inherent energy of mind, are always occupied, with whom the pursuit of one object, when that object is

attained, leads them to the pursuit of another, with others who, having no fixed purpose, have no better resource than that of striving from day to day, or even from hour to hour, to seek some fresh amusement for themselves; and see how different is the actual amount of happiness which they respectively enjoy. To be born to the possession of what are commonly held to be the advantages of life, is, in too many instances, a real misfortune. Small evils which cannot be avoided are magnified into great ones. The Duc de St. Simon, a hanger-on of the French Court, has, with a degree of simplicity which in these days seems marvellous, graphically expressed the anxieties, heart-burnings, and other evil passions, by which he was tormented, because his master, Louis XIV., did not accord to him on small occasions that precedence to which he thought that he was entitled. So in many instances we find a too earnest attention to those slighter bodily ailments, which, if left to take their own course, would soon correct themselves, cause as much discomfort as those who are

better employed experience from actual disease. The *ennui* which is the necessary result of an over-abundance of leisure is not only painful and a mighty evil in itself, but it leads to still greater evils; the victims of it, in not a few instances, being driven to seek relief by resorting to low and degrading pleasures, while in others the circumstance of the mind preying on itself produces a permanent derangement of the general health, and even to such an extent as to shorten the duration of life. The mind and the body mutually act and re-act on each other. If a healthy condition of the body conduces to cheerfulness of mind, cheerfulness of mind is still more necessary to bodily health. In more than a single instance I have received a strange confession from one who might still be regarded as a young man, and of whom others would say that he was peculiarly blessed by fortune, that he was wearied of life, finding that there was so little of real enjoyment in it! I might mention another still more remarkable instance of a gentleman, endowed with considerable intellectual powers,

of great accomplishments, and having great worldly advantages, who deliberately destroyed himself, for no better reason than that he found nothing that interested him sufficiently to make him wish to live.

CRITES. They may be, and I doubt not that they are, correct, but it must be owned that you have given us but melancholy views of human nature. If Nelson or Wellington had been brought up in the Court of Louis XIV., and exposed to the same temptations as Vendôme, they might have been as profligate and idle as Vendôme himself. The overbundance of leisure, with all the miseries and mischiefs which follow in its train, is often a misfortune rather than a fault. It seems to me that, wherever we begin, we are always brought back to the same point, and compelled to acknowledge that we are but the creatures of circumstances, these circumstances being, to a certain point at least, independent of anything that we ourselves can do. It is not of his own choice that one boy is born and

bred among thieves, or that another is spoiled by his parents and trained to idle and selfish habits.

EUBULUS. You may carry your argument further still, and say that we did not make our own minds; that we can but use the dispositions and faculties which God has given us; that our will is influenced by motives, as much as the movements of a clock are influenced by the spring which produces them, or the pendulum by which they are regulated; and thus you may find yourself involved in the metaphysical question as to necessity and free-will. Into that question I am not disposed to enter further than to make the following observations on it. *First:* finding as I do the metaphysical argument to be entirely on one side, and my irresistible conviction to be entirely on the other, I am led to suspect that this is one of the subjects to which Ergates alluded formerly as being beyond the reach of our limited capacities. *Secondly:* that, even if we admit the doctrine of a necessity which rules our thoughts and actions to its full extent,

the practical result is in no way different from what it would have been if we rejected it altogether. If I am not mistaken, it was the late Baron Alderson who on some occasion addressed a jury to the following effect, if not in these exact words: "The prisoner is said to have laboured under an uncontrollable impulse to commit the crime. The answer to which is that the law has an equally uncontrollable impulse to punish him."* We may make an allowance for the external influences which operate on men's minds; we may excuse altogether those who labour under the illusions of actual insanity; but otherwise we cannot get rid of the feeling of responsibility as regards either ourselves or others: and the most thorough-going Necessarian, when he quits the loftier regions of Metaphysics to mix in the ordinary affairs of life, thinks and reasons precisely in the same way as the most unhesitating believer in free-will.

ERGATES. In short, whatever our specu-

* Memoir of Baron Alderson, by Charles Alderson, Esq., p. 128. See additional note A.

lative opinions may be, practically we are all constrained to acknowledge that, however much our intellectual and moral character may be influenced by external causes, more depends on ourselves than on anything besides. This great truth cannot be too strongly impressed on the minds of younger persons by all those to whom the business of education is intrusted, whether it be parents, or tutors, or religious instructors. The wise man, having once learned this lesson, continues to educate himself during the whole period of his life. In doing so, he soon discovers to how great an extent his mental faculties are influenced by his bodily condition, and how necessary it is that he should regulate his habits and mode of life accordingly.

EUBULUS. I need not say that I quite agree with you in the last observation which you have made, as I have myself more than once expressed the very same opinion formerly. I might indeed find much to say on the subject, for it is one that has often occupied my mind; but the questions which arise out of it

belong rather to physiology, and I do not pretend to be a physiologist.

ERGATES. Yet the study of it is not peculiar to the physiologist; he only goes shares in it with the moral philosopher. There is no one, whatever may be his condition in life, and having to exercise his wits even in the humblest way, who is not perpetually reminded that there are occasions on which his capability of doing so is affected by his bodily condition.

I probably have not much to say which may not already have occurred to yourself; and I must request of you to bear in mind that the subject has been frequently referred to by both of us on former occasions; so that as to many of the observations which I have now to offer, it is probable that they may call forth from our friend Crites the remark that I am but repeating what has been already said.

The nervous force is consumed equally in mental and in bodily exertion; and if overmuch of it be expended in one way, there must be proportionally less to be expended in another. The zealous student may be induced

to obtain his knowledge at the expense of his digestion; while another, who is afflicted with an appetite for food beyond the actual requirements of his system, and thus imposes too hard a duty on his digestive organs, is rendered unfit for study.

It is too much to expect that children who have been working in a factory in the morning should profit from anything beyond a very short attendance on a school in the evening. If they do so, it must be at the expense of their bodily health, and probably not without injury to their constitution. Nor in the case of adults, with the exception of the very few whose physical powers and mental energies are much above the average, is it probable that those who have been laboriously occupied in the early part of the day will be able to accomplish much in the way of attaining knowledge and the improvement of their minds in the evening. Other things being the same, a state of perfect bodily health, in which all the animal functions are well and regularly performed, is that which is most favourable to

the exercise of the mental faculties. If some persons of delicate health have been distinguished for their superior intellectual attainments, that is in great measure because they have reserved their powers for the last-mentioned purpose, and have not wasted them in other ways. You referred yesterday to instances of young men who after too severe a course of study have been for a long time rendered incapable of mental labour. Here we must suppose that the intellectual exertion has exhausted the stock of nervous force. But the same thing may happen in other ways, as the result of violent emotions, especially of the depressing passions, disappointments, anger, fear, anxiety of mind. All these operate in the same manner, by using up the nervous force, and therefore interfere with the exercise of the intellect. The man of business, whose mind has been agitated during a succession of dangerous speculations, must reckon on these being rendered still more dangerous, in consequence of his judgment becoming impaired. He too will suffer in another way from the

derangement of his animal functions and the injury to his general health; and this state of things, reacting on the mind, cannot fail to aggravate the original mischief.

CRITES. Then it may be inferred from what you say, that if we suppose a person to exist whose mind is not subject to be in those states which you have designated under the name of emotions and passions, in him the purely intellectual faculties, such as reasoning, thought, and judgment, would exist in greater perfection than in others?

EUBULUS. I will take the liberty of answering for Ergates that we can suppose no such thing. As, in the animal body, if you could take away the liver or the heart, or any other of the vital organs, so essential are these to each other that there would be an end of the entire system, so would the whole mind be at an end, or at least be rendered good for nothing, if any one of the faculties or qualities, or whatever else you please to call them, of which it is composed could be abstracted from it. It is only when those to which you have

just alluded exist in excess that they have the ill effect which Ergates has pointed out; otherwise they are essential to the working of the whole, by affording motives for action, and by supplying materials for and exciting the imagination. In short, such a being would be beyond the pale of human nature, belonging to a mode of existence of which we can form no conception.

ERGATES. You are quite correct in your observation. The mind may be in different conditions, and is constantly passing from one of these conditions to another; but it is always one and the same mind, and, in whatever state it may exist at the time, subject to the same influences. Thus, to take a familiar instance to which I have adverted in one of our former conversations, in an aggravated case of gout, where there is an unusual accumulation of lithic acid in the blood, the temper is peevish and fretful; fits of anger are produced without any adequate provocation, at the same time that, the capability of continued attention being impaired, the reasoning faculty and the judg-

ment are rendered imperfect. So also, where, from the want of a due supply of food, there is an insufficient production of the nervous force, it is not in one respect, but in all respects, that the mind suffers. In the latter case the impoverished blood is deprived of those properties without which it is incapable of maintaining the functions of the nervous system; while in the former case it is not that anything is wanting, but that there is an undue proportion of one of the materials of which the blood is composed, and that to such an extent that it actually operates as a poison.

CRITES. From what you have now said, and from what you said formerly, the conclusion is that the state of mind in any one of us is very much dependent upon the state of the circulating blood.

ERGATES. Undoubtedly it cannot be otherwise, so far as the state of mind is dependent on the physical organization. If a certain dose of opium causes its peculiar visions to be presented to the mind, and if a larger dose

produces sleep, the narcotic poison must have first entered into the blood. So it is with chloroform, alcohol, tobacco, the Indian hemp, and a multitude of other agents which it is needless for me to enumerate.

CRITES. But I suppose you will allow that it is only when they are admitted in excess that such agents are really deleterious. Otherwise, indeed, man, as an intellectual and moral being, must have been from the very beginning of history, and must still be, in a bad way; for there never was a time when one or more of the articles which you have enumerated were not in use, and under all forms of society, from that of extreme barbarism to that of the most highly-bred civilization.

ERGATES. I admit that it seems to be something like an instinct which has led mankind in all ages to have recourse to them; and that, even independently of the use of these things as remedies for disease, there is no one of them which may not, under certain circumstances, be actually beneficial. But a large proportion of the evils to which human nature

is liable arises from the abuse of the natural instincts; and there is probably no one of these the abuse of which has been productive of greater evils than that which I have now mentioned. The most obvious example that can be adduced is in the case of alcohol. A moderate quantity of it taken into the system is productive of no harm, and may be really useful; but we all know how monstrous are the evils which arise from its being taken in excess. We are too often reminded of the degrading effects which this kind of intemperance produces, both on individuals and on society at large, for me to venture to occupy your time in expatiating on them. There are, however, two points connected with this subject on which I would make some remarks:—

First. It is not simply as a liquor producing absolute intoxication that alcohol may be injurious. One person may drink a pint of port wine or an equivalent quantity of some other liquor daily, and that through a long life, with impunity; while in the case of another, though never in a state of intoxication, the effect may

be to render him dull in early life, prematurely stupid in his old age, and probably shorten his life ultimately.

Secondly. The evils arising from the use of alcohol have been fearfully aggravated by the invention of distillation. It is under the influence of gin and brandy, much more than of beer or wine, that bodily diseases arise, and it is alcohol in these forms especially that leads to acts of violence and crime.

Mutatis mutandis, what I have said as to the use of alcohol may be applied to other articles of the same class, such as opium and tobacco. The opium-taker is only negatively mischievous to society; he is dreamy and inactive, but nothing more; and it is worthy of note that the habitual use of opium does not, like that of alcohol, seem materially to shorten the duration of life. So as to tobacco. In the Polytechnic School of Paris it was found that the habitual tobacco-smokers were far below others in the competitive examinations. Tobacco-smokers, like opium-takers, become lazy and stupid, but they have not the vices of gin-drinkers. As

to the effect of tobacco upon the organization generally, I am inclined to think that it is more deleterious than opium, and more productive of disease, when the use of it is carried to excess.

If we had sufficiently accurate methods of analysis for the purpose, we should probably find in many instances that insanity may be traced to some alteration in the constituent parts of the blood, or to something added to it that does not naturally belong to it. A person of my acquaintance swallowed by mistake nearly a wineglassful of tincture of quinine. The first effect of it was to produce some very disagreeable symptoms affecting the head, which however subsided in about twenty-four hours. These were followed by a very inconvenient amount of deafness, which continued for several days. For some considerable time afterwards he was troubled with another symptom, the appearance of phantoms having the form of portraits of heads and faces with old-fashioned wigs, a large number of them presenting themselves at the same time in groups. These phantoms could be made to disappear by an act of the

will, and might be conjured into existence in the same manner. There was therefore no danger of their being mistaken for realities, otherwise they would have been very like the illusions of a lunatic. Of other medicinal agents which are found to be useful in the treatment of disease, it is reasonable to suppose that there are none which, if given in too large a quantity, or continued during too long a period of time, will not do harm instead of good; and I might refer to instances of a state bordering on that of insanity being the result of such an abuse of remedies, and not subsiding until they were discontinued. Facts of this kind, however, may be regarded as belonging exclusively to medical science, and I do not therefore trouble you with any further notice of them. If such facts are of any value, it is not so much because they instruct us as to any definite rules of conduct, but because they serve to illustrate a principle which it would be well for every one to observe who is desirous of turning his faculties to the best account, so that the employment of them may

be as useful as possible to himself, and, I may add, to others.

EUBULUS. You have done quite right in making this last addition. Man is a gregarious animal, and as such is peculiarly situated; the gift of articulate speech bringing him into more intimate relations with others of his own species than we can suppose to be the case in the societies of inferior creatures. However selfish any one may be, these relations cannot be ignored; they come across him at every turn of his life; and if it be important that he should study his own condition with a view to what immediately concerns himself, it is not less important that he should do so with reference to his dealings with others. Ergates has, on more than one occasion, explained how in all of us the temper of the mind may be affected by certain conditions of the body, and how these again may be dependent upon our peculiar habits of life. Hence the same individual who is at one time peevish and ill-tempered, and apt to take offence, may at another time be quite the reverse. To be in

what is called "good spirits" is simply the enjoyment of those agreeable feelings which arise from the different organs of the body working well together, and from the animal functions being properly performed. One result of this is a cheerful disposition; but that implies a great deal more, for, however it may be in greater matters, it leads to sympathy with others in all the smaller concerns of life. Hence we find that those who by their personal influence have become the leaders of mankind have almost invariably been cheerful persons. There is, as Ergates observed in one of our former conversations, a state of mind in which every feeling has something painful superadded to it. No one, under these circumstances, can be habitually cheerful, and it is only by a constant effort to watch over his words and actions that he can compensate for this defect. Yet, if he would do justice to himself and be useful to others, the effort must be made. The effort may be more difficult to some, less difficult to others, but still it may be made by any one who has the right use of his reason;

and although we may make a due allowance for those to whom the difficulty is the greatest, we cannot regard any sane person as altogether divested of that moral responsibility which is one of the conditions of human existence.

CRITES. Do you observe that you are now reverting to a question which you discussed in the beginning of our conversation to-day, when you remarked how "the well-trained mind will come forth triumphant from a contest with the physical infirmities of our nature"?

EUBULUS. In discussions of this kind such repetitions cannot well be avoided; there being so close a connexion between the different parts of the subject, that in treating of any one of them we constantly find ourselves on the confines of another. Indeed, one principal difficulty in the study of that science which relates to the phenomena and laws of mind may be traced to the same source. Writers class the mental faculties as if they were absolutely distinct from each other; and indeed such a classification is necessary to the conduct of inquiries of this kind. But, in reality, as indeed Ergates

has already suggested, those different conditions of the mind to which we give the name of the mental faculties, are so mixed up together, no one of them can be said ever to exist separately. For example, in a system of logic the imagination is altogether disregarded; but in practice it is quite otherwise, and even the pure mathematician would find that he could make but little progress in the advancement of his science, if he did not call in the aid of his imagination.

CRITES. Without disputing the truth of anything that you have now told us, you must excuse me for saying that it seems to me that you are both taking but a one-sided view of human nature. Man is a compound of mind and body. You have explained how he is to make the most of those faculties which belong to him as a being endowed with intelligence; but you have said nothing of those corporeal faculties which he possesses in common with other animals. But assuredly it is no mark of wisdom to regard perfection of any one of the faculties with which we are endowed with indifference.

In our anxiety for the improvement of the intellect, we should avoid the error of underrating the aspirations of those who strive to excel in those things which belong to the body rather than the mind. Now, little as I may excel in these ways myself, I hold that to be capable of enduring fatigue, of performing feats of strength, to be a perfect horseman, the surest marksman,— these, and such as these, seem to me to be worthy objects of pursuit. I should be well pleased if, like the *πόδας ὠκὺς* Achilles, I could contend with horses in a race; or if, like Ulysses, I could bend the bow that was useless in other hands; or if I could emulate Leander and Byron in swimming across the Hellespont. Although it is chiefly to the exercise of the higher functions of the mind that we are indebted for that more perfect civilization which now exists among us, it cannot be denied that, if mankind had trusted to these alone, there would have been no civilization at all. If it be true that man is inferior to many animals in all the applications of muscular force, in the strength of his limbs and of his jaws, and

that his physical powers would have availed him but little in his contests with storms, and floods, and ferocious beasts, if they had not been under the direction of a superior intelligence, it is not less true that the latter, by itself, would have afforded him but a sorry protection against the various causes of destruction by which he was surrounded. Nor indeed is the case very much altered when the highest degree of civilization has been attained. Knowledge and intelligence would never of themselves have been sufficient to produce those marvellous results which are everywhere manifested around us. It is by the intellect of one class directing the physical powers of another that we have been put into communication with the most distant regions of the earth. Without such a combination there would have been no navigation, no intercourse of nations, no railways; nor would that mighty engine which supplies the very limited population of our own island with a greater amount of mechanical force than belongs to the 330 millions of the Chinese empire, have ever been called into

existence, or controlled and managed even if it had been so. Then, even as regards individuals, we must not overlook the fact that there are a multitude of occasions on which the combination of intellectual with physical power is indispensable to great achievements. Taking all these things into consideration, is it not plain that the cultivation of the physical ought to be a subject of attention as much as that of the intellectual faculties in the early part of life?

EUBULUS. The answer to your question is, that for the one purpose it is quite sufficient to trust to man's natural instincts, while it is not sufficient to trust to them for the other. A boy left to himself, without the help of a tutor, would run, and leap, and climb, and play cricket, and use his muscles in all sorts of ways; but it would be a very rare occurrence for him, of his own accord, to learn to read or write. The legislature, therefore, have done wisely in directing their attention to the latter object, and taking no account of the former.

ERGATES. Any direct interference with the

training of the corporeal faculties, even if it were possible, would indeed be ridiculous. Much, however, may be done, and much indeed has been already done, by means of the sanitary measures now in progress for maintaining the masses of the population in that state of general health on which the capability of physical exertion so much depends. At the same time it is plain that it is impossible to devise any sanitary measures which would do all that is required. It is not to be expected that the artisans in crowded cities, living in close habitations, and to a great extent indulging in intemperate and thriftless habits, can enjoy the robust health and the physical powers of a rural population. There needs no other proof of this fact than the difference in the actual mortality of the two classes. Unfortunately, it is shown by the returns under the late census, that while there is a great increase going on in the population of the larger towns, the population of the rural districts is diminished rather than otherwise. I own that I cannot contemplate such facts as these without

some apprehensions as to the future. There may not be any great difference observable in the course of a single generation; but is there not danger that, after a few more generations have passed away, the race will degenerate, and that the mass of the population will no longer be distinguished for those powers of physical exertion, and that unflinching determination to overcome difficulties, which have hitherto contributed so much to the power and welfare of our country?

THE FOURTH DIALOGUE.

Human Happiness.—Promoted by Civilization.—Theories of Happiness.—Happiness affected not less by Physical than by Moral Causes.—Enjoyment of Life experienced by Travellers sustained by simple Food and living in the open Air.—Trampers and Gipsies.—Some Doubts on the Subject.—Feelings of Melancholy without any evident Cause, how to be explained.—Ill-consequences of *Ennui*.—Prison Discipline and Separate Confinement.—Influence of Anxiety of Mind in deranging the Health and producing actual Organic Disease.—General Conclusions.—We must not expect too much of Life.—The Fable told by Socrates in the "Phædo."—Good and Evil necessary Parts of the same System.—Origin of Evil.—Relative Proportion of Good and Evil.—Condition of the Lower Animals in this Respect.

CRITES availed himself of an early opportunity of renewing the conversation in the following manner:—"I have been listening to your lecture on the management of the intellectual faculties, and I have no doubt that the healthy exercise of those faculties is in itself a source of enjoyment; while at the same time the opposite effect is produced by whatever

tends to their degradation. Still it is plain to me that neither in the one way nor the other is the sum of human happiness materially affected. I know many who have had no advantages as to education, or, if they had, did not avail themselves of them, whose thoughts have been directed to the most ordinary pursuits, and who nevertheless seem to be really happier than some of my wisest and most highly-informed friends. But is not to be happy the first object which we have in view, mixed up in some way or another with every thought and action of our lives,—'our being's end and aim, for which we bear to live, and dare to die'? Without denying the importance of the subjects which we have lately discussed, it seems to me that it would answer a better purpose if we were to inquire how we should proceed so that we should pass through our pilgrimage here with the smallest amount of painful feelings; how we may be cheerful and contented, defying the evil and taking advantage of the good which lies in the path which we are to tread."

EUBULUS. I am not aware that those whose education and habits lead them to exercise the higher faculties of the mind have less actual enjoyment of existence than others. That society generally profits by the labours of those who in any way enlarge the boundaries of knowledge is plain enough, for these are the real civilizers of mankind. It might be sufficient for me to refer to what Ergates said on this subject on a former occasion; but it may be further observed, that as the advancement of knowledge leads to the advancement of civilization, so it also tends to the prolongation of the average duration of human life. And from this last-mentioned circumstance we must presume that the result is, on the whole, a greater amount of happiness, as, with some rare exceptions, whatever tends to shorten life is productive of either physical pain or moral suffering.

But, before we proceed further, it may be as well for us to come to a more precise understanding as to what we are talking about; and I would ask, what is the exact meaning which you attach to the word "happiness"?

CRITES. Indeed, I attach to it none but the most common-place and vulgar signification. I consider him to have the greatest amount of happiness who has the largest proportion of agreeable, and the smallest proportion of painful feelings, be they either physical or moral.

EUBULUS. What you call the most common-place is, I apprehend, the most philosophical sense in which the word can be used. We must measure happiness, not by what lookers-on would say of us, but by what we feel ourselves. A man may succeed in all his undertakings, may be beloved by his family and friends, and enjoy the respect and esteem of the world; but you would scarcely call him happy if he laboured under a perpetual toothache. Do you remember the account which Pythagoras, then in the shape of a cock, is supposed to give to the shoemaker, in one of Lucian's "Dialogues," of his position when at another epoch of his transmigration he appeared on earth as a powerful sovereign? He describes how he was living in luxury; how he was worshipped almost as if he had been a

god; how, as he was carried through the streets, the people assembled on the house-tops, admiring him and envying his condition; yet he adds that he could not help comparing himself to those large and gorgeous statues, the works of Phidias or Praxiteles, which are outwardly ivory and gold, but which, on the inspection of the interior, are found to be full of rats and other vermin.

CRITES. Your first illustration is quite to the purpose; but you might well have spared the second. I trust that the definition which I have given is sufficient to show that I labour under no such vulgar delusion as that which you mean to expose — against which we are warned not only by the best religious and moral writers, but even by the story-books which we have read as children.

EUBULUS. Do not suppose that I would pay you so ill a compliment as to attribute to you the belief that there is any intimate connexion between the possession of great worldly advantages and happiness. That is as it may happen. They are good for some, especially

for those who may look upon them as the result of their own exertions—they may be actually bad for others; while, for the most part, they are neither the one nor the other. My object was merely to bring us to the consideration of the manner in which the subject has been treated by others.

"Semita certè
Tranquillæ per virtutem patet unica vitæ."

This is true, but it is not the whole truth; for we see every day that the most virtuous person may have his tranquillity of mind destroyed by circumstances which are not under his control.

At an early period of my life I was set to read a discourse on happiness by the learned author of "Hermes;" but it was as a lesson, and I had not then sufficient knowledge of human nature or of the affairs of life to form a correct judgment as to what it might be worth. An accident led me to read it again lately; and I did so with that interest with which we are apt to return to the studies of our youth. After a long, and, I must add, rather a tedious

argument, conducted, as the author believed, according to the Socratic method, the conclusion arrived at amounts to this, that the way to be happy is to be always under the influence of virtuous motives. But here also I say that this is true, but that it is not the whole truth. Practically we see that the most upright and virtuous intentions are not always rewarded by happiness in proportion, and that either moral or physical causes may operate so as to make a man miserable in spite of them. They may, and will, afford support under all circumstances, and especially in the case of those who feel that they may look with confidence to a compensation for what they may suffer here in a future and brighter state of existence; but they give no absolute exemption from the common lot of human beings.

CRITES. All of which has been told us over and over again; and which no one, who sees what goes on in the world, can venture to dispute. But you may go further than this. Do we not daily meet with instances of those for whose moral qualities we have not the

smallest respect — selfish people, who live only for themselves, for the gratification of their own passions, without regard to the feelings and claims of others — who seem to have their full share of such happiness as this world can afford to any of us?

EUBULUS. Undoubtedly it is so to a certain extent, especially during the season of youth and vigorous health, while a rapid succession of events keeps the mind in a state of continued excitement, and affords no leisure for reflection. But I have lived long enough to watch the course of some such persons, and am led to believe that even in this world the day of retribution rarely fails to come at last. I have seen them, as they advanced in years, fall into a state of melancholy, amounting to hypochondriasis, for which even the most firm religious convictions afforded but an inadequate relief. A philosophical friend of mine has suggested that remorse is the destined punishment in a future state of existence. Be that as it may, I am satisfied that many, who do not own it, even to their nearest friends, are

the victims of remorse even here on earth. Obvious examples of it in one of its forms are almost constantly presented to us in the daily journals, in the notices furnished by the Chancellor of the Exchequer of sums of money sent to him anonymously for "unpaid taxes." Is there any one, even of the best among us, who does not look back with regret at some errors which he has committed at a former, and perhaps distant, period of life?

ERGATES. The subject with which you began this discussion may be viewed under two different aspects, the moral and the physical. It is chiefly under the former of these that it has been viewed by the theologians and moralists who have professed to instruct us as to the surest means of obtaining happiness; but it deserves fully as much to be viewed under the other aspect also. We approached the consideration of it in our conversation yesterday, when I explained that the common expression of being "in good spirits" means neither more nor less than this, that they are those agreeable feelings which are the result of

the different bodily organs acting harmoniously together, and of their various functions being well and regularly performed. The condition of which I speak may be regarded as the most perfect state of animal existence, and I doubt whether there is anything in human life that affords to the individual a greater amount than this does of actual enjoyment. It might not, indeed, suit your ambition; but you may be consoled by the reflection that it is not altogether incompatible with the highest cultivation of the intellect. Therefore it is not beneath the dignity of the greatest philosophers to entertain the question how this object can be best attained.

CRITES. That question being equally important to us all, philosophers or otherwise, we shall be very glad if you will tell us how to answer it.

ERGATES. The subject has been treated of, in one way or another, by a multitude of medical writers, who tell you how to eat and drink and sleep, and everything else. But I do not much advise you to read their books, lest you

might be perplexed by the discrepancy of the opinions which they contain. Thus I have in my mind at present three treatises on diet, in each of which there is a list of proscribed articles of food. But these lists are different, and if you were to adopt them all, you would find very little left to eat. Some very simple rules indeed are all that can be suggested, and each individual must apply them as well as he can to himself. A reasonable indulgence, without the abuse, of the animal instincts; a life spent in a wholesome atmosphere, and as much as possible in the open air; with a due amount of muscular exercise. Really there is little more to say.

The agricultural labourer is tempted, by the prospect of higher wages, to migrate to a manufacturing town: he might well have been content with his former lot. In the one case he breathes an untainted air; the wheaten bread which forms the staple of his food is easy of digestion and sufficiently nutritious; and, even if he were inclined to it, his slender finances do not admit of much indulgence in

the luxuries of spirituous or fermented liquors: while, in the other case, he is not only obliged to breathe the air of a crowded city, but probably of an ill-ventilated factory; being also too often tempted by his larger wages, and the society in which he lives, to indulge in sensualities which are mischievous alike to the body and the mind. Which is the happier condition of the two? The reports of the Registrar-General supply an answer to the question. The average duration of human life in the agricultural districts is beyond that of the great cities; and, for reasons which Eubulus has already given us, I do not know that we can have any better measure of the relative amount of happiness in any two classes than the rate of mortality affords. Travellers in foreign countries far removed from civilization, exposed to the vicissitudes of the seasons, often with no roof to cover them at night, and even with a precarious supply of food, describe this mode of life as having in itself a peculiar charm, which may fairly be attributed to the robust health which they enjoy under these

circumstances, living as they do in the open air, and being debarred as they are from mischievous indulgences.

EUBULUS. That may be in part the right explanation of the satisfaction which it is said that such a wild life affords. But I suspect there is something more than this. There is the novelty of being suddenly relieved from the restraints belonging to civilized society, of which we are scarcely conscious while they exist, but which cannot fail to be sufficiently manifest when they are removed. I do not suppose that there are many, bred up in the midst of civilization, who would long continue to prefer so great a change, though there may be some who would—as in the instance of a friend of mine, the late Mr. Salt, who at two different periods had lived among the Abyssinians, and afterwards filled the office of our Consul-General in Egypt. Mr. Salt was a highly educated person, accustomed to the society of intelligent men in London; and yet he has repeatedly declared to me that he found so much happiness in Abyssinia, that, if it had not

been for the separation from his friends, he would never have returned to his own country.

CRITES. In confirmation of the remarks which you have just made, I may mention that I know an instance in which a benevolent lady made acquaintance with a girl whom she found sweeping the street, and procured for her a situation as a domestic servant, with every comfort which such a situation could afford. The girl behaved very well; but she could not bear the change, and was very soon at her old employment in the streets again. I know another instance in which a similar experiment was made with a young person of the other sex, and with the same result. I have often been struck with the appearance of the gipsies and other trampers, who are found pitching their tents on commons and in by-lanes, and who, I must say, seem happy enough. The case of the gipsies is very much in point; they have been for some centuries roaming through the most civilized countries in Europe, and yet have never been persuaded to part with the freedom which their wild life affords, in exchange for

the advantages of the civilization by which they are surrounded. But do not facts, such as those to which we have just now adverted, tend to confirm the opinion which some have held, that there may be on the whole a greater amount of enjoyment of life in an uncivilized than in a civilized community, and that those whom we contemptuously call savages are, in this respect, really better off than ourselves?

ERGATES. I put no faith in this speculation. The difference between a civilized and an uncivilized community is in the benefits arising from the larger amount of knowledge belonging to the former, as compared with that which belongs to the latter. The restrictions of savage life are at least as great as those which belong to civilization, at the same time that they are of a more painful and onerous kind. You cannot read of the exploits of the kings of Dahomey and Ashantee, or the persecutions in the way of slave-hunting and accusations of sorcery among the races of Africa, as recorded by Dr. Livingstone and

M. du Chaillu, without being satisfied on this point. At the same time, independently of all this, there is, from other causes, a much greater uncertainty as to life, arising from a less regular supply of food and the ravages of disease; so that, in these respects, the trampers and gipsies of this country are a great deal better off than the negroes. The ill-treatment of women among barbarous nations would be in itself a sufficient answer to your question. Abyssinia is much more civilized than the central parts of Africa; yet I suspect that, independently of the separation from his friends, Eubulus's friend, Mr. Salt, would not have been very well contented with his lot, if circumstances had compelled him to live there during the remainder of his life.

Eubulus. If anything were required to show how impossible it is, in discussions of this kind, to separate the influence of physical and that of moral causes from each other, the course which our conversation has now taken would be sufficient for that purpose; for, insensibly, from the consideration of the former

ve have passed on to the consideration of the atter.

But now allow me to ask you, as a physiogist, how you would explain a matter which as often attracted my attention, and which I ave not been able to explain myself. On ome occasions I have laboured under depression of spirits, having what I may call an bstract feeling of melancholy, there being no xternal cause to which it can be attributed, nd it being at the same time, as far as I can udge, not connected with any derangement of ny one of the animal functions. Several of ay friends, with whom I have conversed on hese subjects, have expressed to me that they ave been at times similarly affected, some of hem being much more liable to be so than thers.

ERGATES. I will mention to you a circumtance which I recollect to have happened to myself when I was a boy, and which seems to me to throw some light on the subject. My brothers and I had undertaken a journey, to visit a relation who was staying at the sea-side

waiting to embark for India. It was rather a long journey, and it occupied us two days on horseback. I had never before had an opportunity of seeing the sea, and I had looked forward to the visit with great expectation of the pleasure which it would afford me. I was, however, disappointed so far as this, that for the first two or three days I was actually unhappy, from a feeling of melancholy which I could not account for, and which I could not get rid of. Now, from observations which I have since made, I am satisfied that the real explanation was as follows :—I was not a very strong boy, and the journey had made too great a demand on my physical powers. As a general rule, whenever and in whatever way the physical powers are much exhausted, and there is an insufficient production of the nervous force, although you cannot say that any particular organ is in fault, the individual is liable to that condition of the mind which you have described. An inadequate supply of food will have the same effect. Some of my friends have complained of depression of spirits when

first they awake in the morning, which is not relieved till after breakfast, and which probably arises from the long interval which has elapsed since the dinner of the preceding day without nourishment. M. du Chaillu describes a most painful state of the nervous system which he observed among the negroes in Africa, the result of a too long abstinence from animal food. The vegetable productions which form the sustenance of these poor people do not contain all the ingredients which the human system requires, and animal food is necessary to supply the deficiency. It is true that the peasantry of England, who can obtain but very little of animal food, do not suffer in this manner; but they have wheaten bread, which answers the same purpose. A want of the proper quantity of sleep operates in the same manner, as every one must have learned from his own experience. So it is with some medicinal agents, when administered in too large a quantity or during too long a period of time—iodide of potassium and colchicum, for example. When the spirits have been artificially raised by

means of spirituous or fermented liquors, the exhaustion of the nervous force causes them to be depressed afterwards. From this state of depression a further supply of alcohol affords a temporary relief, and thus we perceive how the habit of dram-drinking is generated. It is the same with the smoking of tobacco. The excitement produced by the cigar is followed by a feeling of discomfort, which another cigar relieves; and thus the occasional is converted into the habitual smoker. Opium-takers are in the same predicament. An acquaintance of mine, who was subject to this unfortunate habit, said to me, "I cannot describe to you the feeling of intense melancholy which sometimes comes over me, without my being able to give the smallest reason for it." For its relief he had again recourse to opium, and thus the bad habit was kept up and strengthened.

The slaveholders of Cuba, who, by the amount of labour which they exact from them, shorten the lives of their unfortunate negroes, have this further sin to answer for, that such gradual exhaustion of the physical powers can-

ot fail to be accompanied by an unhappy state f mind. A more considerate and merciful egislature has interfered in the case of children employed in the factories of our own ountry, who might otherwise to a certain extent have shared the fate of the slaves of the paniards.

CRITES. I can in some degree confirm from y own personal experience what you have said to the effect of over-fatigue of either body mind on the condition of the latter. But is not also true that some amount of employent is absolutely necessary to our comfort, id that there is no much greater source of isery than the *ennui* which arises from the tire absence of occupation?

EUBULUS. You may remember that I fered some observations on this subject in e of our former conversations. Nothing n be much more distressing than that state mind in which the thoughts are not directed any special object, constantly shifting from e to another, and finding nothing to rest on. It lays the foundation not only of

mental but also of bodily disease; and hence it is that instances are not rare of individuals who after a very active life retire, as they suppose, to be happy, but without having provided a suitable occupation for themselves, and who do not survive the change for more than two or three years. I read an account in one of the public journals of a literary man who, being a state prisoner, was condemned by a despotic government to solitary confinement, without being allowed the use of books or pen or paper. I hope, for the sake of humanity, that the statement was untrue; otherwise I cannot imagine an instance of more barbarous cruelty. And here I may take the opportunity of observing that I had myself, at one period of my life, considerable experience as to the effects of what has been called separate imprisonment of convicts in this country. In the prisons under the immediate control of the Government, the convicts are kept constantly employed, never communicating with each other, but attending the school and chapel, taking exercise out of doors, but passing the greater part

of their time alone in their cells, being employed, however, in some kind of useful labour. Where this system is carefully conducted, there is really no material suffering either of the body or mind. The greatest harm that happened to the latter was, that some of the convicts, when first set at liberty, were affected with hysterical symptoms, which soon subsided, and did not prevent them from being useful labourers in the colonies afterwards. Still, without the precautions which I have mentioned, it is difficult to say what mischief might not have happened, both mental and bodily; and this fact ought never to be lost sight of by those who endeavour to carry out the same system in other prisons.

There is no doubt that there is nothing really more necessary to the enjoyment of life than constant occupation of the mind.

ERGATES. You have referred to instances of bodily disease being the result of that unhappy state of mind, to express which we are compelled to employ the French term of *ennui*, for want of an equally appropriate epithet in English. Of course it is only when this state

of mind is in excess, and continued during a long period of time, that such evil result follows. But here we find ourselves on the threshold of another inquiry of great importance, but too extensive and too difficult for us to enter fairly on it at present. I may, however, briefly remark, first, that there is too much reason to believe that long-continued anxiety of mind not unfrequently lays the foundation of actual organic disease, which, proceeding sometimes slowly and sometimes rapidly, destroys life ultimately; and secondly, that in a smaller way we have almost a daily experience of the influence which the condition of the mind has on the general health. The sudden apprehension of some great misfortune will almost immediately interfere with the process of healthy digestion. Those who, impelled by a too earnest desire to become suddenly rich, are engaged in a series of dangerous speculations, are never really in a state of perfect health; and I cannot doubt that, if we had the opportunity of tracing the history of a sufficient number of such persons

o the end of their career, we should find that he duration of life is, in them, much below the verage. The maxim of "*quærenda pecunia rimùm est*," which Horace describes as operating so mischievously in ancient Rome, is perating not less mischievously here; those ho succeed in the race often being really as uch sufferers as those who fail.

CRITES. You must excuse me if I go back to ome remarks just now made by Eubulus as to he effects of the system of separate confinement f prisoners in the Government prisons; recalling to his mind at the same time some other emarks which he made last year as to the desire hich we have to live in society, and which, if recollect rightly, he described to be as much an stinct as hunger and thirst. Surely it cannot e said that any amount of occupation can really ender a life happy, when the gratification of ich an instinct is absolutely prohibited?

EUBULUS. I did not say that prisoners ader this system are made absolutely happy; or is it perhaps desirable that they should be , for in that case there would be no punish-

ment. What I said, or intended to say, was, that the ill-consequences which might otherwise have arisen may by proper management be prevented. Man is a gregarious animal, and suffers from the want of the society of those of his own race, in the same manner as other animals of the same class. Association with others is necessary, not only to his own comfort but eventually even to his existence; nor is it less necessary to the maintenance of his moral and intellectual character. It is a great mistake made by some sentimental writers, when they speak of the advantages of a retired life. Those who live much alone not only become stupid, but narrow-minded and selfish. It is by living in the world that we are rendered capable of judging what we ourselves are worth; that we are taught our own deficiencies, and at the same time what is due to others. I will take this opportunity of observing, though it may not be exactly to our present purpose, that although Walter Scott's observation, that the best part of every man's education is that which he gives himself, is quite true, nevertheless one

ho is wholly self-educated, however great in me respects his merit may be, labours under ery great disadvantages; inasmuch as, not aving had sufficient opportunity of comparing imself with others, he is in danger of placing o high an estimate on his own qualifications, d of believing that the knowledge which he ssesses is peculiar to himself.

CRITES. The conclusions from all that you ve now stated may, I apprehend, be expresed a few words. Our happiness in life depends, a considerable degree, on circumstances hich are altogether beyond our own control. omestic calamities and mental or bodily dis-se may affect it, in spite of anything that we n do. But even here the effect may be modified a considerable extent, as in one instance by pure religious faith, in another by the con-ction that we do not suffer from any ill-nduct of our own. But beyond this there much depending on ourselves, not only on r own prudence and self-command, but also the attention which we pay to our physical ndition. Now all this which you have told

me is really no more than I knew very well before. I acknowledge, however, that the illustrations which your physiological knowledge has enabled you to afford have caused me to view some parts of the subject under a different aspect from that under which I should have viewed them otherwise. What I am about to say, however, may not be undeserving of your attention.

There are not a few who make the great mistake of expecting too much of life, and in whom the disappointment which necessarily follows destroys no small portion of the comfort which life would have afforded them otherwise. Eubulus made some remarks on this subject in our last conversation, and referred to the cases of young men, born to the inheritance of what are considered as great worldly advantages, as being especially liable to be misled in this manner. The mistake, however, is by no means confined to individuals of this class. We see those who in early life have been acquainted with the inconveniences of poverty, who in the efforts to escape from them

have toiled in the acquirement of wealth, as if they expected that wealth alone would afford them all that they could desire to have, and who yet in the end have been grievously disappointed. One man, when this great object has been attained, perhaps far beyond his original conceptions of it, is attacked by some organic disease of which Ergates would probably say that the foundation had been laid by his former labours and anxieties, and which, after a certain amount of suffering, consigns him to the grave. In another, under similar circumstances, the mind gives way, and in the midst of wealth he suffers all the evils of the poverty from which he had been so long labouring to escape. But these are extreme cases. There are others, and those more numerous, in which those who have amassed large fortunes by their own exertions become melancholy and hypochondriacal, partly perhaps from being deprived of their usual occupation, but in a great degree also because they have learned that the object for the attainment of which they had toiled, was worth so much less than they had expected.

EUBULUS. I conclude that you refer to the examples (and these, I am afraid, are not very uncommon) of individuals who, having scarcely ever had any other object in view, have devoted themselves altogether to the acquirement and accumulation of wealth; and it must be acknowledged that you can produce none better to illustrate the proposition with which you set out. There is, as I apprehend, no pursuit really more degrading to the mind than this, nor more unsatisfactory in its results. But we are not to apply this observation to all undertakings in which men are engaged for their own advancement in the world. The statesman, who has guided his country through political difficulties, who has contributed to the promotion of education among the masses of the people, who has done his best for the improvement of the law; the engineer, whose genius has enabled him to throw a tubular bridge over the Menai strait, or to bore a tunnel through the Alps; the painter, the sculptor, the architect, who leave behind them the memorials of their art for the admiration of pos-

terity; the man of science, who has devoted himself to the improvement of the science in which he is engaged, whatever that may be; the merchant, who opens new fields of enterprise to the industry of others; the landed proprietor, who fulfils the duty of his station; —these, and a thousand others, at the end of their career, may look back at their former labours with the satisfaction of knowing that they have contributed to the welfare of others as well as of themselves, and that they have a claim on the respect and estimation of society which the mere possession of wealth could never give them. Still I agree with you as to the importance of the mind being trained so that it may not expect too much of life; and it would be well that parents and others who are engaged in the business of education should keep this in view, and not leave the lesson to be taught only by their adventures in the world afterwards.

ERGATES. Do you remember the fable related by Socrates in the beginning of the "Phædo"? Good and Evil were always quar-

relling, and Jupiter had in vain endeavoured to reconcile them with each other. At last, being provoked by finding them so intractable, he punished them by joining them together, so that wherever one was to be found, the other should be found also. Indeed, it seems to be a question whether the co-existence of good and evil, or, if you please, of pleasure and pain, is not a necessary part of the system which is established in this corner of the universe, in like manner as, in a magnet or a voltaic battery, neither the positive nor the negative pole could have an independent existence; there being, however, this difference, that of the positive and negative poles each is exactly a complement of the other, whereas, as far as we can see, good and evil stand in no such mutual relation.

CRITES. We are here on the verge of an inquiry which has perplexed the greatest philosophers, namely, that which relates to the origin of evil, and the compatibility of its existence with the benevolence of the Deity. But I suppose that Eubulus would interfere by telling us that this is one of those metaphy-

sical speculations to which he alluded in one of our former conversations as leading to no practical result, and which really would carry us beyond the reach of the human intellect.

ERGATES. I agree with you in the opinion which I suppose that you have intended to express, that such speculations are beside our purpose. At the same time I must say there were some other suggestions offered by Eubulus in the conversation to which you have alluded, from which, if we were to pursue them further, we might learn that the solution of the problem to which you have referred is not so very difficult nor so far beyond our reach as some have imagined it to be.

Another question, however, here presents itself, which, being of a more practical nature, I am not so willing to evade. What is the proportion which, in this world of ours, good and evil, or pain and pleasure, bear to each other? Some would have us to believe that the one, others that the other, greatly predominates. What is the real truth of the matter?

EUBULUS. If different individuals give very

different answers to such an inquiry, it is because they cannot fail to be influenced partly by their peculiar temperaments, and partly by the peculiar circumstances under which they are respectively placed. There are those who endure pain from bodily disease, and that during a great part of their lives; there are others who, through a long course of years, have little or nothing to complain of in this respect; and there is an equal difference as to moral suffering, whether it be induced by circumstances not under our control, or it be the result of our own mismanagement. On the whole, however, judging from such observations as I have been able to make during an active and busy life, I cannot entertain the smallest doubt that the good very greatly predominates over the evil, and that the individual cases in which it is otherwise are but rare exceptions to the general rule. There is much of good which, from the enjoyment of it having become habitual to us, we actually overlook. The condition of bodily health in which all the animal functions are well and

regularly performed is in itself a state of happiness, constituting, as Ergates informed us yesterday, what is commonly called being "in good spirits." From constant and unceasing bodily pain there can indeed be no escape; but otherwise we can scarcely say that there are any instances of either physical or moral suffering which are not to a great extent relieved at intervals by better and happier feelings.

But are we not taking a too narrow view of this question, when we limit it to what belongs to the human race? Man, in his pride, is too apt to believe that all the world is made for him; yet the earth teems with life in other forms, even in regions never trodden by man, and in corners into which he cannot penetrate, and where it has no relation whatever to him. Now it cannot be denied that the lower animals have their share of whatever evil exists in the universe. Small birds perish from cold and hunger in a severe winter; the stronger oppress the weaker; and one species prospers and multiplies by the extermination of another. Still, I cannot look on the animal creation

around me without being satisfied that its habitual condition is one of actual enjoyment. In one respect the lower animals are both better and worse off than man; they seem to have little recollection of what is past, and very limited anticipations of the future. While the joys and sorrows of man depend so much on the contemplation of what may hereafter happen, they live in the present hour, the object immediately before them seeming to supersede every other consideration. That such is the fact must be sufficiently obvious to any one who possesses common powers of observation; and if I mention the following anecdote, it is simply because it affords a rather curious illustration of it. I was told it by a gentleman who was an eye-witness of the circumstance to which it relates. In a hunt the hounds had very nearly reached the fox, when a rabbit crossed his path. Apparently forgetting his own danger, the fox turned on one side to catch the rabbit, and was soon afterwards himself seized by the dogs, with the rabbit in his mouth.

THE FIFTH DIALOGUE.

Advantage to be derived from the Intercourse of different Classes of Society with each other.—Objects of Education. — Schools for the Labouring Classes. — What they may and what they may not be expected to accomplish. — Those who are over-educated may suffer intellectually as well as physically. — Exceptions to the General Rule. — Objects of the higher kind of Education. — Value of Truthfulness. — Importance of Female Education. — The Acquirement of Knowledge one Object, but not the principal Object of Education. — Mathematics and the Inductive Sciences not so well adapted to the early as to the latter part of Education. — Advantages of the Study of Language. — Greek and Latin. — Cultivation of the Imagination one of the most essential parts of Education. — The Object of Education is, not that a great deal should be learned, but that whatever is learned should be learned thoroughly. — Advantages of a Variety of Study in improving different Faculties of the Mind. — Examinations and the Competitive System — The Example of Associates more effectual than Precept. — Question as to Religious Education.

In our walks in the village there were few of the labourers whom we met with whom Eubulus did not claim acquaintance, while with some of

them he entered more or less into conversation. One of us having made some remarks on the subject, he answered:—

"I do so partly on principle, believing that the isolation of the different classes, and the separation of them from each other, to such an extent as it exists in this country at the present day, is a great social evil, while I fear that it may lead to still greater evil, perhaps at no very distant period of time; partly because it is a pleasure to me to cultivate a mutual kindness of feeling between my poorer neighbours and myself; and partly also for another reason, as to which I am not quite so disinterested. We speak of the ignorance of the labouring population, especially in the rural districts, and it is quite true that they are ignorant of many things with which we are well acquainted; but, on the other hand, whoever takes the trouble of doing so will find that they have much knowledge which we do not possess. It is with them as it is with those who belong to what are called the higher classes of society. There are some who are

tupid, and many who are careless, and who ıever much learn to observe or think for themelves. But there are still others who make heir own observations on what comes under heir notice, and reason upon them with perfect ccuracy; and from them I have often obtained hat is to me both new and curious informaon. I believe I am correct in stating that in ıe manufacturing districts most of the imrrovements in machinery have originated with ıe artisans to whom the immediate manageıent of the machines has been intrusted; and is difficult to say how much of the improveents of agriculture may not, in the first stance, have been derived from the casual marks and suggestions of farm labourers. owever, it is not to matters of this kind that intended more especially to allude. There e few subjects connected with rural life to which I have not been able to turn y conversation with my rustic neighbours a good account, natural history being one them.

CRITES. You speak of the knowledge and

intelligence of those who have had little advantage as to education. Am I to understand that you infer from this that education does not do so much for us as is usually supposed?

EUBULUS. Indeed I infer no such thing. Education may be, and often is, thrown away—the seed being cast on a barren soil. But education properly pursued never fails to produce a good result. Take the most intelligent of the labouring classes, and I well know that there is no one among them whose power of observation would not have been greater if he had had greater advantages as to early instruction; and under this conviction, when I first came to reside among them, I took an active part in establishing a parochial school, in which, under the immediate superintendence of a liberal-minded clergyman, the children of our village receive as much instruction as the peculiar circumstances under which they are placed enable us to afford them. Our school is a very important part of our little community, and I look forward with rather sanguine

anticipation to the good which it will have produced in another generation.

CRITES. I have had little opportunity of making myself practically acquainted with these subjects; but I do not doubt that your views are correct. Although my professional employments have afforded me convincing proofs that much vice may exist in combination with knowledge, and among those who have had the greatest advantage in the way of education, yet I cannot doubt the truth of what you stated formerly, that much of the evil which exists in the world may be traced to mere ignorance. Some statistics which I have seen, showing how large a proportion of those who are convicted of crime are unable to read or write, justify this conclusion. For my own part, I cannot understand why, with the opportunities now afforded them, and with the aid of the large funds contributed by the State, and the still larger by private individuals, the education of the labouring classes should not be carried much further than it now is. The human mind being much the same in all classes,

we must suppose it to be everywhere equally capable of receiving instruction; and surely some general knowledge of geography, of natural history, of the physical laws of the universe, and even of animal physiology, may be communicated to the children of a parochial school as well as to others.

EUBULUS. I am aware that in these days there are many who hold the opinion which you have now expressed. But according to my observation they prevail chiefly among those who look at these things from a distance, without having much practical acquaintance with the subject. It is, as I have already stated, most desirable that all classes should have some kind of scholastic education; and, with the means which are now available, the time certainly ought not to be far distant when those who are wholly uneducated will form a rare exception to the general rule. But the question is, what is the actual amount of education which those, whose lot it is to have to maintain themselves by their manual labour, may be expected to obtain? and I venture to

ay that what you suggest is much beyond hat which can be generally realized. If the upply of labour were less than it is, in pro- ortion to the demand, and the average price f labour were to be higher than it now is, the ase might be different. As things now are the rural districts, the necessities of the mily are such, that the boys are generally ken away from school as soon as they are le to earn some small stipend by performing me minor duties in the fields. They rarely ntinue to be students for more than three or most four years; and if they learn to read ith ease, to write decently, and to perform me simple exercises in arithmetic, they have complished a great deal, and quite as much those who belong to other classes of society uld accomplish in the same space of time. bserve that I do not say that more than this uld not be useful, but that, except under some ry peculiar circumstances, more than this is practicable; and that in this, as in other tters, we must be content to do, not what desire, but what we can. The education of

the girls, indeed, may, for the most part, be continued for a longer term; but we must recollect that of the time at their disposal a great part ought to be devoted, not to literary attainments, but to instruction in needle-work, and in what belongs to other domestic duties. Although personally I know little of what occurs in the manufacturing districts, yet I apprehend that the case of the children there cannot be very different from that of the children in the country. There they are sent to the mill at a very early age, as soon as they are able to add something to the weekly earnings of their parents. There is still a portion of the day in which they may be at school; but it must be, or ought to be, a very small portion: otherwise would it not be making too large a demand on their physical capacities? Is it to be supposed that a boy or girl who has spent the greater part of the day not only in manual labour, but in a tedious, irksome, and monotonous employment, would, as a general rule, be an apt scholar in the evening? or, if it were otherwise, will any knowledge that can

thus be obtained be a compensation for the loss of that amusement and relaxation which is essential to health and happiness, and, I may add, to vigour of mind, at that early period of life? The more I consider the subject, the stronger is my conviction that as to the scholastic education of the labouring classes no more is to be expected from it than some such moderate instruction as that which I have already mentioned; it being at the same time provided that they have access to a good lending library afterwards. If anything more can be done, it must be under some peculiar circumstances, of such rare occurrence as in no way to affect the general rule.

ERGATES. There is much truth in the vulgar proverb that "all work and no play makes Jack a dull boy." I believe with you that it is only to a limited extent that the education of children can be advantageously combined with bodily labour. Even in the case of grown-up persons some intervals of leisure are necessary to keep the mind in a healthful and vigorous state. It is when it is thus relieved

from the state of tension belonging to actual study, that boys and girls, as well as men and women, acquire the habit of thought and reflection, and of forming their own conclusions, independently of what they are taught, and the authority of others. In younger persons it is not the mind only that suffers from too large a demand being made on it for the purposes of study. Relaxation and cheerful occupation are essential to the proper development of the corporeal structure and faculties, and the want of them operates like an unwholesome atmosphere or defective nourishment in producing the lasting evils of indifferent health and a stunted growth, with all the secondary evils to which they lead.

CRITES. Still I am not convinced. I need only refer to the numerous instances which have been adduced of the pursuit and acquirement of knowledge under difficulties. How many are there, who, having begun life under the most disadvantageous circumstances, have at last become ornaments of the age in which they lived, as men of science, or moral-

ists, or scholars, or even as poets! And I do not understand why, under a judicious management, the catalogue of individuals thus elevated in the scale of intellect and knowledge should not be greatly augmented.

ERGATES. I am afraid that I have not made what I intended to say sufficiently clear. I referred to what must be regarded as the general rule, and I made an exception as to what may be accomplished under peculiar circumstances; as, in those very few gifted persons in whom an earnest desire of knowledge is combined with a corresponding amount of intellectual capacity and capability of physical exertion, I take it that it will rarely happen that, in some way or another, having once made a beginning, even with the humblest kind of instruction, they will not find the means of having their aspirations gratified. But it is not while in the parochial school, but afterwards, as they approach to man's estate, when they are accustomed to think and reason for themselves, that they will seek and find the opportunities of improvement. It was as a

common soldier that Cobbett so trained himself as to become not only one of the most influential political writers, but also one of the greatest masters of literary composition of his day; and it was in an equally humble station that Ferguson found leisure, while pursuing his occupations in the fields, to lay the foundation of the reputation which he afterwards acquired as a mechanical philosopher and astronomer, and that Hugh Miller, as a stonemason, grew up to be an eminent geologist.

CRITES. I agree with you that such persons must depend mainly upon themselves. But you have yourself already admitted that something may be done in the way of assisting them in the process of self-education, when you mentioned the advantages arising from the access to a lending library. The so-called Mechanics' Institutes tend to the same result, and more still might be accomplished by the establishment of museums and lectures in the larger towns. Such institutions, indeed, would have a more extended influence by increasing the appetite for knowledge in all parts of the com-

munity. Those who are born to the enjoyment of ease and affluence would ultimately profit by them not less than those who are compelled to earn their livelihood by their manual labour. It must, I fear, be acknowledged that even among the former there is a large amount of ignorance, and much that is required to be done. How many are there on whom the opportunities of a complete and long-continued education have been thrown away, who go out into the world at last with nothing better than the outward show of refinement, and, from the want of some more worthy object, betake themselves to mean and frivolous, and too frequently even to degrading and demoralizing pursuits!

ERGATES. I wish that I could dispute the correctness of your last observation. But does not this confirm the opinion which I heard expressed in a public lecture, by one of the most distinguished philosophers whom this country has produced, to the effect that there must be something wrong in the prevailing system of education among the more affluent classes,

when it so frequently leads to no more satisfactory result?

EUBULUS. We must take human nature as we find it. In all classes of society there are a certain number whose minds admit of being trained only to a very limited extent; in whom there is a want of mental, as there is in others of physical power. Among those whose qualifications are of a higher order, there are some who love knowledge purely for its own sake. There are others who, not being wanting in their desire of knowledge, are also influenced by the prospect of obtaining reputation for themselves; and we must not complain of such aspirations, when we find that the consequences are so beneficial to the world at large. And here it may be observed that those who have to carve out their own fortunes for themselves possess a great advantage over those who are differently situated, inasmuch as it is with them a matter of necessity that they should make the best use of the abilities which they possess, whatever they may be.

Still, I do not mean to deny that there may

be some defects in the prevailing systems of education. It would be marvellous if it were otherwise, considering how imperfect all other human institutions are. I do not profess to point out what these defects may be, nor have I, indeed, that practical knowledge of the subject which would make me competent to do so. I may, however, venture to suggest whether, as regards the higher kind of education, too much is not attempted to be done, and whether it would not be better if the students were left to accomplish more for themselves. But even as to this there can be no general rule; there being some who are incapable of learning anything except what they are actually taught, while there are others whose natural disposition it is to teach themselves and think for themselves. Unfortunately we have no means of distinguishing beforehand these two classes from each other; and even if we could do so, there would be a difficulty in varying our mode of proceeding so as to adapt it to each individual case.

ERGATES. That may be true. And here I would refer to some remarks which you made

in one of our conversations last year, as to the ill-effect produced by the great extension of the competitive system, in stimulating many to exertions beyond their powers, and in promoting the exercise of the faculty of learning at the expense of the higher qualities of observation and thought.

EUBULUS. If we are to engage in the discussion of these subjects, it will, I conceive, be better not to enter into a critical examination of the prevailing systems of education, but rather to consider generally what are the principal objects which should be kept in view, and what it is that a well-conducted education may be expected to accomplish.

To begin at the beginning. It seems to me that the first thing is that a young person should be made to understand the value of truth, not only that he should never deviate from the rule of telling the truth, but that he should on all occasions desire to learn the truth, and do this to the best of his ability, not considering whether the result will be agreeable and convenient, or otherwise. Not only

is this the surest foundation of the moral virtues, but without it the exercise of the intellect, on whatever it may be employed, can lead to no satisfactory result. This, you may say, is a matter so obvious that it scarcely deserves an especial notice; and yet it is to the want of a thorough conviction as to the value of truth, and the amount of labour and caution required for its attainment, that we may trace a large proportion of the disappointments to which we are liable in the ordinary concerns of life, as well as the many erroneous notions which have been from time to time propagated, and the fact that many things which at various times have passed for knowledge in the world have proved in the end no better than a sham and an imposture.

CRITES. It is not indeed to be supposed that those who have acquired the habit of misrepresentation and exaggeration in common things can form a proper estimate of the value and importance of truth on great occasions; so that even when they have no actual inducement to deceive others, they may not be too

ready to deceive themselves—drawing their conclusions from insufficient premises, being influenced by their prejudices and passions, and love of novelty, and, I may add, by their indolence. But this part of education belongs to the earliest period of life, long before the schoolmaster and college-tutor have entered on their vocations. The example of a lying nursery-maid during childhood may affect not only the moral but even the intellectual character of the individual ever afterwards.

EUBULUS. Still, if we are to inquire into the subject of education, we must, as I said before, begin at the beginning, and not lay the blame merely on the nursery-maid. The bad example of the parents themselves, and their own bad management of their children, whether it be by a system of too great indulgence or of too great severity, will often do more mischief, by inducing a lax habit as to the telling or seeking of truth, than anything that goes on in the nursery.

Nor is it only in this respect that "home-education" too frequently fails in the cultivation

of those qualities which are essential to the right use of the intellect, leaving much to be undone by the individual himself, or by those to whom the special business of education is intrusted afterwards. The example of idleness and of frivolous pursuits, among those whose situation lifts them above the necessity of any regular or serious occupation, has, in too many instances, a most prejudicial influence, and places their children at a great disadvantage, as compared with those of professional men, and of others who are differently circumstanced in this respect. Those whose minds are of a higher order, it is true, overcome the difficulty; but the chances are that others will devote themselves to nothing better than the pursuits of their fathers and mothers.

CRITES. But "*quis custodiet ipsos custodes?*" You are referring to evils which are so interwoven with the intimate texture of society, that to counteract them by any human means seems to be almost a hopeless undertaking.

EUBULUS. To counteract them altogether out of the question. Yet I am sanguine

enough to believe that it may be ultimately accomplished to a considerable extent. Where the "home-education" of children is deficient, that may be chiefly attributed to the imperfect mental cultivation of the parents themselves; and you have yourself already referred to one source to which we may reasonably look for an improvement in this respect. The fact of any one class in society being more thoroughly educated and better informed cannot fail to have an influence over others. If the superior classes allow themselves to be distanced in the race, they will find ere long that they are in danger of losing the position which they occupy, with all the advantages belonging to it. Money is power, which is certainly none the less from it being combined with the *prestige* of birth and rank; but knowledge and intelligence are a greater power still, and if the two should unfortunately be placed in opposition to each other, there can be, as I apprehend, not the smallest doubt as to which of them must ultimately prevail.

ERGATES. You have certainly not over-

rated the importance of that early training of he mind which belongs to what you have alled "home-education," affecting as it does he intellectual not less than the moral cha- acter of any one of us. And here be it ob- erved, that under ordinary circumstances more lepends on the mother than on the father; rom which we may judge how necessary it is o the well-being of society that the education f the female sex should include studies of raver interest, and not be exclusively devoted, s it too often is, to the acquirement of those ccomplishments which are merely graceful nd ornamental.

CRITES. But as you have begun the inquiry, hope that you will pursue it further. It eing granted that, by the influence of precept nd of example, which is more effectual than ll the precept in the world, a good founda- on has been laid during the earliest period of fe, what are the principal objects to be kept n view afterwards, when the business of edu- ation has been formally begun? And first, hat is the kind of knowledge which is best

suited to the capacities of a boy in the outset of his career as a student?

EUBULUS. Certainly, from the beginning to the end, the acquirement of knowledge is an essential part of education. But I cannot regard this as the only object, nor even as the principal object—at any rate, it is not so in the first instance. The acquirement of knowledge is the instrument by means of which the intellectual faculties are to be exercised and developed, and brought into harmony with each other. The power of attention, industry, and perseverance,—these are the qualities in which children are generally most deficient, and which stand most in need of cultivation.

CRITES. But are not these qualities to be regarded rather as natural gifts, varying in degree according to the original structure of the individual mind? Ergates will agree with me when I add that they are also dependent on the physical organization, the state of health, and other circumstances connected with the animal condition.

EUBULUS. Undoubtedly there is a great original difference in this respect. Let us suppose a given number of persons, whose situation as to external circumstances is precisely similar; we should find that some acquire habits of industry and perseverance much more readily than others. By some the power of abstraction and long-continued attention to the thing before them is attained with ease, and by others not without an almost painful effort. So it is, also, with the power of reasoning. Some minds are so constituted that they are able to take cognizance at once of the evidence on both sides of a question, discerning their relative value, and, by something like a natural instinct, coming to a right conclusion; while others, having a more limited range, blunder on, never advancing beyond a partial view of the subject, and probably wasting a vast amount of labour in groping their way among small and insignificant details, the consideration of which, by diverting their attention from things of more importance, has no other effect than that of perplexing and mystifying the judgment. But

as the muscles become weak, and as the organs of sense become obtuse, if not exercised, so from the same cause do the faculties of the mind, whatever they may have been originally, run to waste if neglected; while, on the other hand, there is no one of them which may not be improved by cultivation. The exercise of the mind required for the pursuit of any kind of knowledge, whatever its ultimate value may prove to be, will in a greater or less degree answer the intended purpose. The habit of idleness may be gradually converted into that of industry and perseverance—he whose natural disposition it is to wander from one subject to another may be made to acquire the habit of attention; and the result must be to make an imperfect memory more capacious and retentive.

CRITES. When you say that the pursuit of any kind of knowledge will answer the intended purpose, am I to understand that all kinds are in this respect alike, and that a good education may be obtained equally by means of any one of them?

EUBULUS. Certainly not. First, it is desirable that whatever knowledge is acquired should be such as may, in some way or another, be turned to a good account, and made the foundation of a higher knowledge, afterwards. Then different studies require the exercise of different mental faculties. Mathematics, more especially geometry, and even common arithmetic, strengthen the power of attention, and therefore are peculiarly useful to those who are naturally deficient in this respect, while the higher mathematics are absolutely necessary to those who cultivate some branches of natural philosophy, as astronomy and mechanics. Further, mathematics being a deductive science, in which, a general principle being assumed, it is afterwards applied to particular cases, it renders us better qualified to deal with other sciences of the same class, such as jurisprudence and moral philosophy. Observe that I use the term "moral philosophy" in its strict and literal sense, not applying it, as it has been applied by Dugald Stewart, to the science of mental phenomena generally.

But as questions in mathematics have nothing to do with degrees of probability*, the conclusion arrived at being either true beyond all possibility of doubt, or there being no conclusion at all, so the study of mathematics does not materially help us in those other departments of knowledge in which every question has two sides, and in which we have to compare the facts on one side with those on the other, and determine on which side the evidence predominates. It is the faculty of readily and accurately calculating probabilities which distinguishes what is commonly called a man of sound judgment, whether it be in the common affairs of life, in politics, in the investigation of history, or in the practice of professions; and for the strengthening of this faculty we are not to look to geometry or algebra, while great advantage may arise from the prosecution of some other sciences, such as natural history, chemistry, geology, or animal physiology. For this reason I apprehend that the introduction

* See additional note B.

of some one or more of these inductive sciences into the curriculum of education, which is already to a certain extent taking place, cannot fail to be productive of good, at the same time that it will answer another purpose, by supplying a store of knowledge which may be turned to a good account at a later period of life; explaining many daily occurrences which would be inexplicable otherwise, unveiling many mysteries, and counteracting the influence of numerous deceptions and impostures, by which, even in the most civilized state of society, many individuals, from their ignorance of these subjects, are liable to be misled. Nor would it be difficult to show that such studies may administer to the personal well-being and advantage of those who prosecute them. Take, for example, the last of the sciences which I have enumerated, animal physiology: even a general acquaintance with it would enable us to know something of the causes which tend to derange the bodily health, and to regulate our course so as to avoid their operation; at the same time helping us to the acquirement of

that self-knowledge of which we have spoken formerly, and as to the importance of which I believe that we were all agreed.

CRITES. Not at all denying the truth of all that you have now stated, still I cannot but believe that inquiries connected with mathematics and the natural sciences belong properly to the more advanced stage of education, and that they can be of little avail unless they are preceded by other studies, which are not only necessary to the study of the sciences themselves, but which can never be so efficiently pursued as at that early period when the memory is more active and more retentive than at any later period of life. Not only is it by means of articulate speech and written language that, whatever the subject may be, we obtain the most important part of our knowledge, but we use language as the instrument of thought. Without it we should be incapable of carrying on any but the simplest processes of reasoning. The study of language, which includes of course the study of grammar, is properly regarded, in all civi-

lized countries, as that part of education which should precede all others. Of course some particular language or languages must be selected for the purpose. Whether, in this country, we are right in the preference which we give to the ancient languages of Greece and Italy, or whether Dr. Latham is right in the observation that these might be taught in some more philosophical and convenient manner than that which is usually adopted,— these are questions as to which there may well be some difference of opinion.

EUBULUS. It was far from my intention to recommend the study of mathematics and the inductive sciences as the fittest subjects for the early part of education. I agree with you in all that you have said as to the study of language being the best and surest introduction to that of other things; and I may mention another advantage belonging to it, in addition to those which you have enumerated. The practical instruction as to the rules of grammar which a boy acquires is a good foundation for the study of the philosophy of grammar after-

wards, and, if he be of an inquiring mind, will lead him to it; and this last is a branch of knowledge which, interesting and important as it is in itself, is rendered still more so by the fact of it necessarily including an analysis of the mental faculties, thus leading to the contemplation and study of the mind itself.

You have expressed a doubt as to the advantage of selecting the ancient rather than the modern languages for the early part of the educational system of the present day. You may remember that on a former occasion I made incidentally some remarks on this subject. The study of these languages, which we can know only from books, requires more thought, more attention, more exercise of memory, than that of our own language, or the kindred languages of modern Europe. The boy who sets seriously to work to make himself master of Greek and Latin acquires a knowledge of grammar which he may easily apply to the language which he speaks himself. The tree may be known by its fruits. As a general rule, are not the best writers in the English language to be found

among those who have been conversant with the Greek and Roman classics?

But it is not on these accounts alone that I should lament to see the day in which these studies were neglected. Can there be any compensation for losing the knowledge of Greek and Roman literature? Has it not been the foundation of the highest literature of these later times? Does it not provide for us a standard of taste, by a perpetual recurrence to which we preserve a purity of taste among ourselves? Is there any better exercise for the imagination, as we advance in life, than that afforded us by an acquaintance with the classical writers, the poets, the historians, the moralists of antiquity? Is there anything that can tend more than this to the cultivation and expansion of this great, this transcendent faculty of the human mind?

CRITES. You have, on other occasions, expressed yourself in somewhat similar terms as to the importance of the imagination. But does it not occur to you that this faculty, which you dignify with the name of transcendent, is

often no better than an incumbrance, the exercise of it leading to all sorts of errors and mistakes? It really seems to me that if in the matter of education we concern ourselves at all about it, it should be rather to limit it, and repress its exuberance, than to foster and exalt it. Is it not those having a too lively imagination that, defying the rules of logic, become Mormonites and Ranters, and attracted by all sorts of visionary speculations, from the well-meant Utopia of Owen of Lanark, down to the quackeries of socialism and table-rapping? In the study of mathematics, the interference of the imagination is, as a matter of course, rejected altogether; while in the inductive sciences, as Bacon has shown us, our business is to collect facts, classify them, and draw our conclusions from them, without allowing either the one or the other to be distorted by it.

EUBULUS. Allow me to state the opposite side of the account. My remarks have been intended to refer to the imagination existing in combination with accuracy of observa-

tion and a sound judgment. The plodding man, who has great power of attention to the thing before him, but who, if he has any but a feeble imagination, rejects the use of it, may learn, as it were by rote, what others have taught; but he will be neither an inventor nor discoverer, and will really contribute nothing to the advancement of knowledge. There is an abundance of individuals who have some one faculty more than usually developed; but the really great intellects, which form the ornament and the glory of the age to which they belong, are those in which the different faculties exist in a just proportion, so that they may limit and control, and at the same time help each other. Imperfect as we all are, it would be alike vain and presumptuous to look for such perfection in this respect as our day-dreams might suggest; but it is only by those in whom there is some approach towards it that great things in any way are really accomplished.

Now there is no one faculty which is so constantly exercised as the imagination. If you could look into the inmost recesses of their

minds, you would find that a large proportion of mankind live as much in the imagination as in the realities of life. It is so not only with the ardent youth who builds castles in the air, and conceives himself to be the leader of armies, who aspires

> "To scatter plenty through a smiling land,
> And read his history in a nation's eyes,"

but it is so with many of the most sober-minded and matter-of-fact individuals among us. As we walk in the streets of London, there is nothing that we see in the shop-windows, nor in the persons whom we meet, nor in the carriages which rattle by us, that is not suggestive of something else, of something that we do not actually see or hear, diverging into trains of thought and speculations having perhaps only a distant relation to the objects which are around us. The mind of him who sits before the fire, apparently idle, may be occupied with trifles, or it may be wandering over the visible universe, or soaring into higher regions still; but the imagination is always at

work, ever restless, ever active either for good or for evil. Under this view of the case, you cannot, I conceive, do otherwise than agree with me in the opinion that no part of early education is more important than the discipline of the imagination, so that it should be directed to worthy objects, not discouraged or repressed, but restrained and regulated.

Observe how important a matter this is in connexion with morals. The boy who has been bred up among thieves will not be less imaginative than he whose more fortunate position has been in a more virtuous community; but how different must be the dreams and speculations of their leisure hours! Let us suppose two boys having an equally retentive memory, but that the mind of one of them is stored with the vulgar ballads which we see placarded on a blank wall in the streets, and that of the other with the most noble passages of the Greek and Latin poets, of Shakespeare and Milton, and consider how great will be the difference which these different attainments will make in their respective thoughts and conduct

in all the relations of life afterwards! If the spoiled child grows up to be a selfish man, is it not because his imagination has been taught to speculate on the gratification of his own wishes and his own appetites, disregarding the just claims and rights of others? The imagination will be at work whether we will or not, nor should we wish to prevent it if we could. But the direction which it takes, while it depends partly on the original constitution of the individual mind, depends in a great degree also on the materials which it has to work with; and in this respect a great deal of good may be accomplished by the instruction and discipline of early life.

CRITES. You must not suppose that I doubt the influence which the imagination exercises over the moral character. Still, I do not see what it can have to do with those intellectual processes the object of which is to ascertain the reality of facts and to draw just conclusions from them, and which seem merely to require accuracy, patience, freedom from prejudice, and careful investigation.

EUBULUS. You may remember that some allusions were made to this subject in one of our former conversations; and what I have to say on it now can be little more than an expansion of what I intended to express on that occasion.

For the mere learning what has been done by others, little else is required than the power of attention and a good memory. These are great qualities, but without other aid they will carry you no further.

If there be a question as to a mere matter of fact, where whether it be so or not is to be determined by a comparison of the evidence on one side with that on the other, it is the imagination which helps us to explore and collect the materials, the relative value of which is to be determined by the judgment afterwards.

The experimentalist arrives at a result at which neither he nor any other has ever arrived before. Does the whole truth flash on his mind at once? Far from it. It is when he makes it the subject of meditation afterwards that his imagination brings before him

the relations which it bears to his previous knowledge, enabling him to look at it on every side, and to detect sources of error which he would otherwise have overlooked, and the detection of which may modify, or even entirely alter, the views which he had been led to adopt in the first instance.

As the imagination is the essential part of the genius of the poet, presenting to him analogies and relations which are not perceived by ordinary minds, so it is the main instrument of discovery in science and of invention in the arts. To the philosopher who enters on a new field of inquiry, it furnishes those lights which illuminate his path and lead him onward in his journey,—fallacious lights indeed if he trusts implicitly to them, but far otherwise if he takes them for no more than they are worth, not supposing that they can in any degree supersede the necessity of strict observation and a hesitating and cautious judgment. Such is the history of all the great achievements in the inductive sciences; nor is it otherwise even with those sciences in which we have to deal,

not with probabilities, but with absolute certainties. How many crude notions must have passed through Newton's mind before he completed the invention of fluxions! So it is with all other human pursuits, whether it be in the case of Marlborough or Wellington arranging the plan of a campaign, or of Columbus directing his course over the hitherto unexplored Atlantic Ocean, or of Watt engaged in the invention of the steam-engine. Wherever great things are accomplished, it is the imagination which begins the work, and the reason and judgment which complete it. It is the same thing on a smaller scale with the ordinary, and even with the humblest, occupations of life; and this being admitted, I revert to my original proposition, that the discipline of the imagination is an important part of early education. Here I may add, that the study of the physical sciences must be especially useful in this respect, inasmuch as they deal with matters of fact, which, being cognizable by the senses, afford us peculiar facilities of testing the accuracy of the views which the

imagination has suggested, and of correcting the errors into which it might lead us by being too discursive.

CRITES. When we were speaking of the education of the labouring classes, you rather took me to task for expecting that more might be accomplished than can be accomplished in reality. But it seems to me, that with respect to the higher kind of education you are yourself falling into the same error. Is it to be supposed that the mind of any young person can embrace all the variety of subjects which you have enumerated,—language, the philosophy of grammar — the last, as you say, leading to the study of the mind itself — mathematics, the natural sciences? And may I ask, are all these really necessary to the objects which education has in view? Will not such a diversity of pursuit tend to perplex rather than to help an ordinary intellect — to heap up knowledge rather than to give a healthy and vigorous action to the individual faculties?

EUBULUS. Yet you will scarcely doubt that from this variety great advantages may

arise. In one kind of study one faculty is more especially cultivated, in another another, and so on. Thus every variety of mind may find its suitable occupation, at the same time that no one faculty is absolutely neglected. Then, where the attention has been limited to a single object, narrow-mindedness, and a too low estimate of everything else, are apt to be the result — faults which, if corrected at all, must be corrected by others afterwards. Nor can it be doubted that he who, after his scholastic education is completed, enters on the active duties of life with a store of general knowledge, will be much more qualified to be useful in his vocation, whatever it may be, than he whose knowledge is more limited. At the same time it would be absurd to expect that every one should be an equal proficient in every branch of study. All that I contend for is, that while each individual devotes himself more especially to those inquiries which are most adapted to his peculiar taste and peculiar talents, others should not be absolutely and entirely neglected.

In saying this, I hope that I may not be misunderstood as expecting that all young persons during the period of education should obtain a complete and profound knowledge of the subjects to which their attention has been directed, nor even of any one of them. There may be some who, from a combination of superior mental with superior physical power, form exceptions to the general rule; but such exceptions are rare. To be a great Greek scholar, or a great mathematician, or a great anything else, must for the most part be a man's own work, after what is called his education is completed. This does not imply that we should be content with the attainments of the student being merely superficial. However little he may learn, that little should be learned thoroughly, so that his mind may be trained to habits of accuracy and perseverance.

ERGATES. Some of your late observations bring us back to a subject which we in part discussed formerly. For the more intelligent students there may be, I conceive, as well too much as too little of systematic education.

Such persons, after a sufficient foundation has been laid, will do more for themselves than others can do for them. It is only by those who are thus to a considerable extent self-educated, that great things are accomplished afterwards.

The system of examinations which is now being extended from schools and colleges to professions and the public services, cannot fail to be useful if it be confined to the one object of ascertaining that the candidates have that amount of knowledge which is necessary for the position which they desire to occupy; but it will be otherwise if it be carried further than this, and especially if the principle of competition, to any considerable extent, be made an essential part of it. In a difficult and elaborate examination, those who have in the greatest perfection the capability of learning what is already known, though they may have nothing else, will have the advantage over those who observe and think for themselves; yet it is to the latter that we must attribute the higher order of talent, to whom we look

for the greatest results, whether it be in the way of advancing knowledge, or in the more active pursuits and ordinary business of life.

CRITES. *Aide-toi, et le ciel t'aidera.* I doubt not that this law applies to education as it does to everything else. But there is a subject connected with these inquiries to which neither of you have adverted, but which is especially of importance as involving that principle of self-education of which you have been speaking. Example is more influential than precept. In the formation of his habits and character, at least as much depends on the society in which a young man is placed, as on the instructions of his tutors. Idleness and industry, regularity and irregularity of conduct, in other respects are alike contagious, and the advantage of the best opportunities as to education will be thrown away on one who is careless as to the choice of his companions.

EUBULUS. What you have now stated is quite true ; but surely you do not mean to say that your remarks are applicable only to the earlier periods of life. Old and young,

our thoughts and actions are liable to be moulded by those of our associates. A quiet man who joins a mob becomes infected with the feelings of those by whom he is surrounded, and takes a share in outrages which he would have shrunk from previously. The well-bred gentleman, who wishes to preserve his purity of taste, will do well to avoid dealing with sharpers on the race-course. I would ask Ergates if it be not true that when one young woman in the wards of a hospital is seized with paroxysms of hysteria, others do not follow her example? But here we are entering on questions which would lead us far beyond the limits of the discussion with which we set out, and on the consideration of which I am not myself prepared to enter at present.

CRITES. You have given us your views as to the requirements of education, but you have omitted one important subject. Am I to understand that religious instruction forms no part of your system, and that you consider education to have no other object than that of cultivating the intellect? If it be so, I must

confess that my notions are very different from yours; nor can I conceive that to adopt such a system would be right as to those who are to be educated, or otherwise than dangerous to society at large.

EUBULUS. Nothing can be further from my intention than to recommend any course of study from which religion is to be excluded. But it is a delicate matter to treat of; and I own that I am not willing to enter into the discussion of it so far as to expose myself to attacks from dogmatic theologians. Thus much, however, I must venture to say, that the religious instruction of a young person should be of that simple kind which he can easily comprehend, teaching him that it is his duty to worship God, to love his neighbour as himself, and to cultivate that charity to others without which faith, that would move mountains, is nothing worth.

THE SIXTH DIALOGUE.

Natural Theology.—Dr. Samuel Clarke.—Derham, Paley, &c.—The Phenomena of the Universe governed by General Laws.—But the Laws which are now in operation may not have been in operation always.—Questions as to Equivocal Generation.—Beginning of Animal and Vegetable Life the Result of some Special Interference of the Creative Power.—Different Views entertained on this Subject.—Darwin, and the Origin of Species.—Probable Explanation of the Commencement of the different Varieties of the Human Race.—Facts favourable, and others unfavourable, to the Theory of Development.—Partial Views of Metaphysicians on the one hand, and of Physiologists on the other.—Dr. Prichard's Argument showing the Existence of Mind independently of Organization.—Mind of the Lower Animals.—Speculations of Bishop Butler.—Place of Man in the Scale of Creation.—Articulate Speech and Written Language.—Causes tending to the Advancement of Civilization.—Questions as to the Unity of the different Races of Mankind.

We were occupied in Eubulus's library, when Crites, who had been for some time engaged in looking over the books, apart from his friends, thus remarked:—"I see you have a long array

of volumes relating to Natural Theology, beginning with Dr. Samuel Sharpe, and ending with the Bridgewater Treatises. I am aware that many of these last contain much curious information, with occasionally some interesting general views as to the course of natural phenomena; at the same time it seems to me that works of this kind are scarcely required. With regard to Dr. Samuel Sharpe's *à priori* argument, I must confess that it is to me incomprehensible; and as to the other argument, by which the existence of an intelligent Creator is inferred from the marks of design in the works of His creation, I do not see that we have really advanced much further than the Psalmist, when, some 3000 years ago, he inquired, 'He that planted the ear, shall He not hear? He that formed the eye, shall He not see?'"

EUBULUS. With respect to Dr. Samuel Sharpe's speculations, I entirely agree with you. Being no German scholar, I have perhaps no right to give an opinion as to those of the great German metaphysician, Kant;

though, from the account which I have read of them, I suspect that they are equally incomprehensible with those of Dr. Sharpe. But with regard to some other writers, such as Derham, Paley, and the authors of the Bridgewater Treatises, although they may have produced no new argument in favour of the existence of a Deity, have they not done much to strengthen the old argument, by presenting to us so many important facts in illustration of it? And have they not done even more than that, by affording us some insight into the course which the Deity has thought fit to adopt in regulating the phenomena of the universe? The order and regularity in the course of events is, in some instances, too obvious to have been overlooked even by the rudest of mankind. Thus, night succeeds to day; the full moon returns at stated periods; winter and summer regularly succeed each other. These, and a thousand other things, bear testimony to the fact that the phenomena of the universe are subjected to certain well-defined laws, from which, at present at least, there is no deviation. But, in

a multitude of other instances, the same signs of order and regularity are not at once disclosed to our observation. Hence, in all ages, much of what goes on around us has been attributed to chance, as if that term, which is, in fact, only a confession of our ignorance, expressed something which had a real and substantial existence. Others have supposed that the natural course of events was continually interfered with in other ways. The uncivilized inhabitants of Africa, when their land is parched with drought, invoke the assistance of a rain-maker, and look for clouds and showers as the results of his incantations. The classical mythology of Greece and Italy filled the world with minor deities, who, even more than the gods of Olympus, interfered in human affairs and in the operations of nature. Ulysses is reported to have been preserved from the perils of the sea by an amulet given to him by a sea-nymph; and Horace, in compliance with the prejudices of his day, if not with his own belief, attributes the preservation of his life, when it was endangered by the falling of a

tree, to the benevolence of a sylvan deity. The researches of science have opened to us wider and larger views of this universe in which we live. Eclipses of the sun and moon, which formerly were supposed to occur at random, and by which nations were alarmed, as being the portents of some impending evil, are now ascertained to be as regular in their occurrence as day and night, as the seasons and the tides. Wherever we extend our knowledge, the same signs of regularity and order are manifested; and it is plain that the minutest as well as the greatest phenomena are alike subjected to certain positive laws from which there is no deviation. Modern observations have instructed us in the law of storms; and we cannot doubt that even the smallest particle of dust raised by the wind pursues its destined course with as much certainty as the earth travels in its orbit round the sun.

CRITES. It may be so. Yet I own that it seems to me a somewhat dangerous doctrine. There have been sceptics who have believed

that the laws of nature were, if I may use the expression, self-existent; and that what we now see around us is but a continuation of a system that has been going on from all eternity — thus dispensing with the notion of a great creative Intelligence altogether.

EUBULUS. Under any view of the subject, it seems to me that it would be very difficult, if not impossible, for any of us practically to separate the marks of design, and of the adaptation of means to ends, which the universe affords, but which are more especially conspicuous in the animal and vegetable kingdoms, from the notion of an intelligent Cause. There is not one of the sceptics to whom you have alluded, who would not, if he were asked the question, "What is the use of the eye?" answer, "that it is intended to be the organ of vision, as the ear is intended to be that of hearing, and as the nostrils are constructed for the purpose of smell." But what I said just now requires some further explanation. When I stated that at the present time there is no evidence of any deviation from certain established

laws of nature — that if we could thoroughly know and thoroughly appreciate what those laws really are, we should be able to account for all the phenomena around us — I was far from intending to say that there has never been a period when other laws than those which are now in force were in operation, or that the time may not arrive when the present order of things will be in a similar manner superseded. Looking at the structure of the globe, and the changes in its surface which have been disclosed to the observation of geologists, we recognize the probability that there was a time when this planet of ours was no better than a huge aërolite, and in a state quite incompatible with animal or even vegetable life. The existence of living beings, then, must have had a beginning; yet we have no evidence of any law now in force which will account for this marvellous creation.

CRITES. Then am I to understand that you would reject altogether the hypothesis of equivocal generation, which supposes that under certain circumstances, even at the present time,

particles of inorganic matter are brought together, and so united as to become endowed with organization and life?

EUBULUS. The question is one of great interest, and I will refer you to Ergates for an answer, knowing at the same time pretty well what that answer will be.

ERGATES. Of course Crites refers to the production of those minute creatures, known by the name of *Infusoria*, in the experiments of Walter Needham, and some others.

It is true that in these experiments certain vegetable and animal infusions, after no very long period of time, when examined by the microscope, are found to contain a multitude of minute creatures, of various forms, exhibiting signs of spontaneous motion, and multiplying their species in the usual manner. Some of these are even of a complicated structure, much beyond what might, *à priori*, be expected as the result of the first attempt of inorganic matter to enter into the realms of organic life. The subject has been so frequently discussed, that I need not trouble

you with the details of the arguments which have led the most eminent naturalists to believe that these creatures are not really spontaneously engendered, but that they are derived from minute ova which are present in the air, and which, when placed under circumstances favourable to their development, burst into life: in the same way as the egg undergoes those changes which convert its contents into a bird, when placed under the influence of the animal heat of the parent. But even if this view of the matter be not correct, the case is not really altered; for, after all, the *Infusoria* are never detected except in vegetable and animal infusions, which necessarily presuppose the existence of organic life.

CRITES. Then I take it for granted that you attach no credit to the story which Virgil gives us in the Georgics, of a swarm of bees being produced spontaneously in the carcase of a dead cow?

ERGATES. Certainly I do not believe the conclusion at which Virgil had arrived; but substitute the word "bluebottle-flies" for the

swarm of bees, and I can understand on what foundation the story rests. These flies deposit their eggs in the flesh of the dead animal; presently you find these eggs developed into larvæ; and these, with the peculiar rapidity which belongs to insect life, are very soon converted into flies. We cannot suppose that Virgil, who shows that he had so well and so successfully studied the natural history of bees, could himself have made such a mistake; but it might well have been made by more ignorant persons, and the great poet may be supposed to have been misled by hearsay evidence.

Before quitting the subject of this so-called equivocal generation, I would take this opportunity of adverting to a circumstance which throws considerable light upon the question. Among the minute microscopic animals to which I have adverted, there are some which, though apparently dead, preserve their vitality, so that they may be revived after a very long period of time. Thus, for example, the minute animal *Vibrio*, which constitutes the peculiar blight of corn known by the name of the Ear-

cockles, and of which a description has been given by Mr. Baüer in one of the volumes of the "Philosophical Transactions," may be seen in the form of a dry, brown stain upon the glass, and yet, on being moistened, may be brought to life again, even so as to multiply its species, after a year's interval; and this experiment may be several times successfully repeated.

CRITES. Then, if I understand you rightly, you have arrived at these conclusions. First, that there was a time when this earth was not in a fit state for the maintenance of either animal or vegetable life. Secondly, that in its present condition there is no evidence of any law being in operation which would account for any living beings being called into existence except as the offspring of other living beings which previously existed; and that from these premises we cannot fail to arrive at this further conclusion, that the first introduction of life on earth must have been by some special act of the creative power, of which we have no experience at present.

EUBULUS. I suspect that this, really and

truly, is all we actually know on the subject. But the inquisitive mind of man, on this as on a multitude of other occasions, has attempted to overleap those boundaries by which our knowledge is limited. There are two different speculations as to the beginning of the animal creation, each of which has its advocates. The more common of these is, that at different times animals have been called into existence, such as they now are; one creation disappearing and being succeeded by another, which was to disappear in its turn. The other speculation being, that some primordial germ was originally cast upon the earth, so artistically and wonderfully constructed that it contained within itself the rudiments of every animal organ that has since become developed; and that this, by a process of gradual transformation and multiplication in the course of a long series, I will not say of years, but of ages, has caused the earth to teem as it now does with its millions of millions of inhabitants.

Crites. If I were to choose between the two hypotheses, I must adopt the former as

being consistent with the history afforded us by the Sacred Writings, and reject the latter as being inconsistent with it.

EUBULUS. I must earnestly protest against this practice of placing questions in religion and questions in science in opposition to each other, as being equally detrimental to the cause of both the one and the other. The Inquisition at Rome subjected Galileo to the torture, because he asserted that the earth moved round the sun, and not the sun round the earth. But what Galileo taught has long since been universally believed, and religious faith remains unshaken. In our own time the discoveries of geology startled the minds of some pious persons, as if these were opposed to the history of the Creation contained in the first chapter of Genesis. Yet further consideration of the subject has shown that such apprehensions were unfounded, and religious faith remains undisturbed. The truth is that it was the object of the book of Genesis to instruct us, not in physical science, but in the relations of man to his Creator. Whenever and in whatever way the

human race first began to exist on earth, that was the epoch of the creation of man. The theory of the gradual development of the multitudes of living beings from one primitive germ, as first propounded by the elder Darwin, and afterwards by Lamarck and the author of the "Vestiges of the Creation," has been not unfrequently viewed with suspicion, as if it had a tendency to Atheism. Yet there can be no greater mistake. Trace back this system to its origin, and you find that it takes for granted as marvellous an act of creative power and wisdom as can possibly be conceived. In saying this, however, you must not suppose that I am advocating the hypothesis in question; for really, notwithstanding all that has been said on the subject by the learned and sagacious author of the "Origin of Species," I find so many difficulties in the way, that I am very far from being convinced of its truth; and I think there is no one who will not find a great stretch of the imagination necessary to enable him to conceive that an oyster, a butterfly, a viper, and an elephant are all derived from one common

stock, and are but different forms of one original element variously developed.

ERGATES. The question is indeed a very wide one. There is abundance of evidence that the different species of animals are capable of undergoing certain transformations, so that what we now see may present appearances very different from those which the same species presented formerly. Sometimes these transformations take place gradually, in the course of many successive generations, as in the case of the despised, ill-treated, and ill-fed Bosjesman, or in that of the negroes who have been partially civilized in our West India Islands, and whose appearance is very different from that of their own race who have been taken on board the slave-ships. At other times the transformation may be sudden, arising from circumstances which we cannot explain, and which we therefore call accidental. For example, there may be an Albino boy in a family in which there had been no Albino before. Let this boy grow up to man's estate, and marry, and it is probable that

one or more of his children may be Albinos like himself. But let him marry an Albino woman, and all the issue of such a marriage may be Albinos, like their parents. Suppose two such families to be placed on an island by themselves, and then to intermarry, and there would probably then be a distinct race of Albinos, as there now is of negroes. It is likely that in the earliest stages of society it was in this manner that those great distinctions of the human race which now exist had their origin. The breeders of domestic animals well understand this principle, the operation of which is nowhere more distinctly manifested than in the various races of dogs. Mr. Darwin has well illustrated the subject by his experiments on pigeons; yet he has overlooked one very essential and important fact. The transformations to which I have alluded are confined to the external form, to the limbs, to the skin and its appendages. There are bandy-legged sheep, cattle with short horns or no horns at all; dogs with long legs and slim bodies, dogs with short legs, big dogs and

little dogs; Albino rabbits and dark-coloured rabbits; and so on. The Dorking fowl has an additional claw; and in one instance only, quoted by Mr. Darwin, there was an additional bone in the spine of the pigeon. But these transformations do not extend to the internal and more important vital organs, nor to the muscles and nerves, nor even to the general form of the skeleton. The negro is distinguished by his woolly hair, by his projecting jaws, the shape of his legs and heel; yet it matters not to the student of anatomy whether the subject of his dissection be a negro or an European. Those organs which are the special objects of his study, the viscera of the chest and abdomen, the brain and nerves, and, I may add, the muscles, are similar in both. The same observation applies to the various races of dogs. However different their size and external form, as to the important organs, the dissection of one tells you all that you want to know as to the rest. But still further with regard to what belongs to external form, there is great reason to believe that animals, however much

this may have become altered, have a tendency, if left to themselves, to return to their original type.

The main argument on which the theory of development of which I have been speaking is founded is the resemblances and analogies, as to both structure and functions, which may be traced throughout the whole of the animal creation, and which make it appear as if the respective forms of it had been framed in a great degree according to the same pattern, partaking of a common character or type. In all of them life is maintained by the inhalation of oxygen and the conversion of it into carbonic acid, and by the assimilation with their own substance of matter which had previously formed a part of some other organic body, either vegetable or animal. Excepting those which are the very lowest in the scale, there are none which do not possess something that is analogous to muscles, brain, and nerves. The gills of fish, the air-cells of insects, correspond to the lungs of the other classes. The wings of birds represent the fore legs of quad-

rupeds. It is needless to multiply examples of this kind, with which every one is familiar. But even if we admit that in the course of a series of ages these and other organs may have become gradually transformed one into the other, there are instances of other organs which seem to have had no prototype, and which suddenly appear in a limited number of animals, as if by some special act of the creative power. Of this fact, the poisonous fangs, and the gland for secreting poison, of the venomous snakes, the electric battery of the torpedo and other electric fishes, and the spinning apparatus of the spider, are obvious examples. There are no structures in other animals from which we can conceive that these have derived their origin. So that even if the theory of development be true, it cannot be said to contain the whole truth; and this is sufficient to make it doubtful altogether.

CRITES. Then I may conclude that you have not become a convert to this modern doctrine?

ERGATES. You may conclude no more than

this: that the thing is so far beyond the limits of my experience, and that, in whatever way I look at it, I find the question so beset with difficulties, that I cannot venture to form any opinion on the subject.

EUBULUS. There is another difficulty in our way, to which you have not adverted. It is probable that, in some of the very lowest forms of animal life, the functions, such as they are, are performed merely automatically; and there is no reason to believe that these simple creatures are endowed with anything like sensation and volition, any more than vegetables. But, as we ascend in the scale of animal life, we find another principle superadded,— a principle which, even in worms and insects, is the subject of sensation and volition, and which, as we ascend still higher in the scale, we find endowed with the faculties of memory, imagination, and thought, attaining their highest degree of perfection, with the addition of a sense of moral responsibility, in the human race. Now I can conceive it possible that such a supposed primordial germ as that to which you have referred

may have contained within itself the rudiments of some at least of the various organic structures to be developed afterwards; but that is quite a different thing from it being the original seat of those functions which belong to the mind and intellect. I am aware that, coordinately with an extension of the mental and intellectual faculties, there is an extension and greater complication of the nervous system, especially of that part which we call the brain. But, *à priori*, we have no more right to say that the brain makes the mind, than that the mind makes the brain. In some modern works on Physiology, I see the mind spoken of as one of the properties (or, as they now call it, forces) inherent in matter, corresponding to gravitation, electricity, magnetism, and so on; the doctrine, in fact, being, that a certain arrangement of the molecules of matter in the brain leads to the production of mind, as a certain arrangement of metals and acids in a voltaic battery leads to that of electricity. But this is a doctrine which I cannot easily accept. I cannot perceive the smallest analogy between the processes of mind

and what are called the forces inherent in the molecules of matter. There is so wide a gulf between them that one can in no way be compared with the other. I have no conception of any form of matter which is not essentially and infinitely divisible; the only thing of which I have any knowledge, which is essentially indivisible, is my own mind. The materials of the body, including those which compose the brain, are in a state of constant change. The brain of to-day is not the brain of yesterday, and probably there is not a molecule left of that which belonged to it a year ago. But, amid these changes, the mind preserves its identity. The belief in the identity of my own mind is as much inherent in me, and as much a part of my constitution, as my belief in the existence of an external world; I can in no way emancipate myself from it. It is said, indeed, that we have no experience of the existence of mind or intellect, except in combination with material structures; but is it so in reality? The answer to such a question has been briefly and clearly stated by the learned

author of "The Physical History of Man;" and I cannot do better than refer you to his own words:—"The whole universe displays the most striking proofs of the existence and operation of intellect, or mind, in a state separate from organization, and under conditions which preclude all reference to organization. There is, therefore, at least one being or substance of that nature which we call mind separate from organized body, not only somewhere, but everywhere."* However immeasurable the distance may be between the mightiest intellect of man and that of the Deity, it must be admitted that they belong to the same mode of existence; and I do not understand how any one who believes in the existence of a Deity can receive without hesitation the doctrine that any kind of mind can be nothing more than the result of a peculiar arrangement of the molecules of matter. But, insensibly, I have been drifting back into the consideration of subjects which we discussed last year; and I remember that

* Prichard on Nervous Diseases, Introduction.

you, Ergates, on that occasion, adduced the same argument as that which I have just quoted from Dr. Prichard.

CRITES. I own that that argument seems to me to be very well founded, and it is somewhat remarkable that it should have been so much overlooked as it has been, both by physiologists and by metaphysicians.

EUBULUS. It is less remarkable as to the former than it is as to the latter. And here I am rather glad to have the opportunity of observing that these two classes of inquirers contemplate these subjects under very different aspects. The physiologist begins with making himself acquainted with the material structure of the animal body. He then studies the functions of different organs. He finds the action of muscles regulated by the ordinary mechanical laws of matter. The circulation of the blood is subject to laws similar to those which regulate the motion of fluid under other circumstances. The changes which the blood undergoes in the lungs and in the secreting glands are altogether chemical; the

eye is as much an optical instrument as the microscope; and when he comes to the brain, he is too apt to regard the mind to be simply a function of the brain, in the same manner as the secretion of bile is a function of the liver. The metaphysician begins at the other end. He studies the mind irrespectively of the corporeal system; to him it has a reality of existence beyond that which he can attribute to the material world; and Dr. Berkeley and Arthur Collier have gone so far as to give reasons for doubting the existence of the material world altogether. Neither of these, as I apprehend, pursues exactly the right course. The human mind, as it comes under our observation, is to so great an extent influenced by the condition of the body, that it cannot be the proper object of study if the latter be disregarded; while the physiologist is equally wrong in regarding the mind simply as a function of the brain, overlooking the entire want of relationship between the phenomena which the mind exhibits and those presented by the material world.

CRITES. Reverting to some of your former

observations, I must observe that they lead to rather a strange conclusion. If the mental principle in the lower animals be regarded as belonging to the same mode of existence as that in man, then we must suppose that it has the same independence of organization in the former as in the latter. But how opposite is this opinion to that which is generally entertained of the relations of man and the inferior animals to each other!

EUBULUS. But I do not see at what other conclusion we can arrive, unless we adopt the hypothesis of Des Cartes, that the lower animals are mere automatons, whose actions appear to be directed by the sense and the will, while they are merely mechanical, like those of the puppets in the Marionette Theatre. On this subject, however, I may refer you to a much higher authority than myself; the question having been raised and sufficiently discussed by a learned divine, the author of the "Analogy of Religion to the Constitution and Course of Nature."

ERGATES. The truth is, that the pride of

man has led him to overlook the facts which you have now stated, and even to regard himself as if he were the only object for which the universe is created. In acknowledging the superiority of man to all the rest of the animal creation on earth, we must at the same time acknowledge not only the possibility, but the great probability, that there are in some regions of the universe organized beings endowed with faculties as much superior to those of man, as the faculties of man are superior to those of the humblest quadruped; and such beings might with as much reason regard us as having nothing in common with themselves, as we should deny the same thing to the animals below us. If I recollect rightly, Bishop Butler, to whom Eubulus has just referred, goes so far as to believe it probable that the future life which man hopes to claim for himself will not be denied to the lower animals. But, after all, this is one of those subjects which are so entirely beyond us, that it is a pure waste of time for us to speculate upon it. It is enough for us to have some faint glimpses of the intentions

of the Deity as far as we ourselves are concerned; and it is not less idle than it is presumptuous to attempt to dive further into the mysteries of His government.

EUBULUS. It would indeed be presumptuous to say that your speculation, as to the existence in some part of the universe of created beings very much superior to the human race, cannot be well founded: it being at the same time not at all so to assert that the gulf which separates man from other creatures with which we are acquainted is so great, that he may well be regarded as having a peculiar mission upon earth. Let it however be observed, that the superiority of man is to be looked for, not in what he actually is, but in what he may be made to be by cultivation. The raw material, indeed, seems to be but a poor concern. As was observed in one of our former conversations, his physical structure affords him no means either of offence or defence, compared to what belongs to many other animals. He has neither tusks, nor claws, nor rapidity of locomotion. The poor children who

have been left deserted in the woods, as in the case of Peter the Wild Boy, and the Savage of Aveyron, although they have contrived, perhaps during some years, to provide a precarious subsistence for themselves, have, when discovered, exhibited very few of what may be considered as the characteristic attributes of man, and have rarely profited by instruction afterwards, so as to learn to speak; they have, indeed, generally been regarded as idiotic. The only advantage which man possesses as to his physical structure is that it is adapted to the greater powers of his intellect. His legs and feet are sufficient for locomotion, and leave his upper extremities at liberty to be employed for other purposes. The only creatures that have anything corresponding to his hands are the apes; but their hands, useful as they are for the purpose of climbing, are quite unsuited for those nice actions which belong to the human hand. If an ouran-outang were suddenly gifted with human intelligence, he would not be able to write or engrave, or make or polish a needle. In them, what we call the thumb is

not a thumb in reality. Independently of its form and the position which it occupies, the muscles which belong to it are not such as would enable it to answer the purpose of a human thumb.*

But another distinction, beyond all comparison more important than that of the possession of a hand, is the faculty of articulate speech,—a faculty with which no other animal than man is endowed; for we cannot with any good reason give this appellation to the barking of a dog, or the chattering of a monkey, or to the few words which a raven or a parrot may learn to pronounce without attaching a meaning to them. The voice of other animals is limited to the modifications of sound made by the larynx; and as such it is undoubtedly useful, as affording them the means, to a certain extent, of communicating with each other. But these modifications are limited in number, and would be quite insufficient to express the multitude

* For further information on this subject the reader may be referred to the interesting observations contained in Sir Charles Bell's Bridgewater Treatise.

of ideas or thoughts, or whatever you may be pleased to call them, which belong to the mind of man. The communications of some of the smaller insects with each other by means of the contact of the *antennæ* must be a more imperfect language still; but the varieties of articulate sounds, including their simpler combinations, are almost endless, and, being so, are thus adapted to the greater requirements of the human intellect. To creatures of a smaller intellect the same faculty would be useless.

ERGATES. I cannot do otherwise than cordially assent to all that you have said on the subject of articulate speech. It may well be considered as being at the same time the most important and the noblest attribute of man. Not only does the possession of it imply a higher degree of intelligence than that which belongs to other animals, but the result of it is, that by the communication of knowledge from one to the other, and the discussion and interchange of opinions, it leads to a development of the intellectual powers far beyond

that which could otherwise have taken place. Nor must we overlook the fact, that words are instruments of thought, without the aid of which it would be impossible for us to apply the reasoning powers which God has given us to any but the most simple propositions.

EUBULUS. Articulate speech is the foundation of writing and printing. Written language, like articulate speech, is at once effect and cause; the invention of it is the result of the higher intelligence which man possesses, at the same time that it leads to a greater development of that intelligence in which it has originated. I need not repeat the oft-told tale of the influence which it has exercised in extending the boundaries of knowledge; but be it observed, that, like articulate speech, it is itself a help to the operations of the mind. Thus, for example, I at this moment perfectly well remember many pieces of poetry which I learned when I was a boy; but in bringing them to my recollection it often seems to me that I have before me the book and the very page from which I first committed them to my

memory. I do not say that I read them off word by word; but there is the general aspect of the page, which, by association, brings before me what otherwise might have been forgotten. To those who are deaf and dumb, writing and printing are exactly the same as articulate speech is to those who do not labour under this calamity; as others remember words which are spoken, so they remember those which are written; and I cannot doubt that they answer to them the same purpose as instruments of thought.

CRITES. Is it not reasonable to suppose that the written characters of the Chinese do not in this respect answer the same purpose as alphabetic writing, the latter exactly representing the words which are uttered, the former representing things themselves; so that the Chinese, Cochin-Chinese, and the Japanese use the same characters, although their oral languages are different? Is it not from the want of the more convenient alphabetic character that the Chinese, clever people as they undoubtedly are, have, for probably 2000

years, stopped short in the progress of civilization?

EUBULUS. Undoubtedly the influence of these two methods must be very different. In the case of alphabetic writing, the writing immediately brings to the mind the words which it was the intention of the writer to express; and, reciprocally, the words that are spoken at once suggest the written characters which represent them. It is not so as to the written language of the Chinese. The connection between the spoken and the written language is entirely arbitrary; they do not help each other; and hence it is, that to be a perfect master of the latter is almost the labour of a life.

The arts of writing and printing may well be considered as the greatest achievements of mankind, and have contributed more than any other inventions to aid a purer and more humane religion in the advancement of civilization. Observe that I use that word in its best sense, as signifying the extension of knowledge and the humanizing our species.

But other things, many of which have been accidental in their origin, have undoubtedly contributed to the same result. How helpless an animal would man have been without the possession of fire! If the civilization of modern Europe be of a higher kind than that of ancient Greece, this may well be attributed to the progress which has of late been made in the pursuit of the physical sciences, and to the influence which these studies have exercised on other branches of learning. But what would the physical sciences have been, if it had not been for the accidental discovery of glass, improved, as it was afterwards, by human ingenuity and skill? Without it there would have been no telescopes, no astronomy; and the sailor who now fearlessly traverses the Atlantic Ocean would have hesitated to conduct his vessel far from the sight of land. What would chemistry have been, if it had not been provided with glass vessels, combining the property of transparency with the capability of resisting the action of the most powerful chemical agents? If it had not been for the

discovery of the uses of iron, which must originally have been accidental, we might still have been provided with no better cutting instruments than those flint knives and hatchets which are now exciting our interest as indications of the forlorn condition of our ancestors. Much might be said on this subject, but nothing more than any one's imagination will readily suggest to him.

CRITES. Another element mixes itself up with this question. Is there not a great difference in the intellectual quality of different races of mankind? Take the negro, for example, of whom we know more than of any other of those which are considered as the inferior races. The negro race occupies the greater portion of an immense continent, with all varieties of soil and climate. They are neither better nor worse than they were 2000 years ago, as rude and uncivilized as ever. Does not this seem to justify the opinion which some have held, that they should be considered as being really a different species, and the result of a separate creation?

ERGATES. I know that is an hypothesis which has been propagated in the slave states of America; I cannot, however, admit it to be well-founded. I need only refer you to some observations applicable to this subject, which I made in a former part of our conversation. The difference in structure in the negro and European races is like that which may be traced in the different varieties of dogs and sheep. The more important internal organs, those on which the maintenance of life depends, including the brain itself, are the same in both instances; in fact, the only real difference, and that a comparatively small one, is in the form of the skeleton, in the skin and its appendages. At the same time I fully admit the inferior intellectual capacity, not only of the negroes, but of many other varieties of mankind. A friend of mine was in the habit of attending the negro schools in Sierra Leone; and his report of them was, that the children, up to a certain point, learned so rapidly that, to use his own expression, it was delightful to teach them; but that they

could go no further. They have, by neglect, degenerated from the higher type of human nature. It is reasonable to conclude that, if properly cared for, they would gradually improve; and you may recollect that I formerly referred to the fact of the superiority of those negroes who had been for some generations domesticated and instructed in Jamaica, over the poor creatures who are brought to the island after having been delivered from slave-ships.

EUBULUS. But here we have entered on a field of inquiry of such vast extent, that, for my own part, I must confess that I cannot undertake the exploration of it. We have noticed some sufficiently obvious causes which tend to promote, as others tend to retard, the progress of civilization. But there are many others. How much must depend on the form of government; how much on the soil and climate; on the influence of peace and war?* A long life would not be sufficient to enable

* See Additional Note C.

the most diligent inquirer to answer all the questions that might be raised; and it would be idle for us to attempt to do so in the brief space of time which we can afford for a discussion of this kind. There is only one further observation which I shall venture to make. I do not doubt the possibility of negroes, or any of the other inferior races, being capable of improvement. But, even under the most favourable circumstances, such an improvement must be very gradual; and many generations of them must have passed away before it can be expected that they should even approach the point which has been attained by the more civilized communities of the present day.

THE SEVENTH DIALOGUE.

The Pony and the thorough-bred Horse.—Hypothesis of the "Indefinite Perfectibility" of Mankind.—Objections to this Hypothesis.—Intelligence and Civilization do not stand in any exact relation to each other.—Civilization promoted by the Extension of Knowledge.—Probable Improvement of the Mental Condition of the Inferior Races of Man, in the course of Time.—Future Destiny of Man.—Speculation as to the Future History of the Animal Creation.

THE day had arrived which was to terminate our second visit to Eubulus; but an inspection of the time-table showed us that we had still some time at our disposal before it was necessary to proceed to the railway station. We had made acquaintance with a rough-looking pony, in the service of some of the junior branches of Eubulus's family, which we had sometimes met with in a neighbouring meadow, and it was in reference to this animal that Crites observed: "Does it not seem remarkable

that this humble quadruped should have sprung from the same stock with those beautiful thorough-bred horses which we lately saw in your neighbour's stables? Such a transformation cannot, I suppose, have been otherwise than very gradual, the result of careful culture during many successive generations. This simple fact is in itself one of great interest; but it has a still higher interest if we apply the principle on which it rests to the probable destinies of the human race. The civilized inhabitant of modern Europe is as much superior to the Australian savage as the thorough-bred horse is to your pony. In those prehistoric times when such flint knives and hatchets were in use as have lately been brought to light by geologists, the inhabitants of this very island were probably little above the condition of the Australian aborigines. You and Ergates have told us how, in the human race as well as in animals, old instincts may be lost, and new instincts may be generated, which last are capable of being transmitted from the parents to the offspring.

How much does the civilization of modern times exeel that of all former ages! Taking all these things into eonsideration, shall we be too sanguine in our views if we speculate on a period arriving, far distant as it may be, when the qualities of the human race will have attained a much higher degree of perfection than belongs to them at present; when the intellectual powers will be more largely developed, the moral sentiments more refined; and when many of those evils which are the result of man's imperfect nature, and by which even the best form of soeiety is now infested, will be banished from the earth?"

EUBULUS. I must first say a few words on behalf of my pony, whose eharaeter you have not rightly estimated. It is true that he has not the elegant form, nor the ease and faeility of loeomotion, whieh belong to those thoroughbred horses to which you have alluded; but he has not less power of enduring fatigue, and he is a remarkably elever and sagaeious little animal. He is on terms of great intimacy with all the members of my household, and

seems to consider himself as a part of my family. Physically, he may be inferior to the thorough-bred horse; but otherwise I am inclined to believe that he has the advantage over him. These facts, as you will by-and-by perceive, have an important bearing on the question which you have raised.

The "indefinite perfectibility" of man is no new speculation. It was one result of that fermentation of men's minds which existed at the period of the French Revolution, when Robespierre, rejecting vulgar superstitions, marched in a triumphal procession as the high-priest of the Goddess of Reason;

> "when busy men
> In sober conclave met, to weave a web
> Of amity, whose living threads should stretch
> Beyond the seas, and to the farthest pole;"

and when some even went so far as to believe that the time would arrive when the term of man's sojourn upon earth might be indefinitely prolonged.* The threescore years which have

* See Additional Note D.

since elapsed have, I fear, not confirmed these expectations. That some improvement, both intellectually and morally, may take place in the course of many generations, I have already admitted. At the same time we must not lose sight of the fact that, although the mental condition of the negroes of our West Indian Islands may have been rendered somewhat superior to that of their progenitors in Africa, those of Hayti are fast relapsing into their original barbarism. Do you really believe that any people of the present day possess a greater amount of intellect than those of the little country of Attica possessed more than two thousand years ago?

CRITES. Surely you must admit that the civilization of modern Europe is of a much higher character than any which has been ever attained before; and is not this fact alone sufficient to show that my speculation may not be altogether ill-founded?

EUBULUS. You may well take it for granted that those varieties or families of mankind in whom the powers of the mind are

most developed are more fitted than others to enter on the career of civilization. Still it would be a mistake to suppose that the two stand in any exact relation to each other. When New Zealand was discovered the inhabitants were but savages, little better than the poor negroes of Africa; yet, from all the accounts which we have had of them, it would appear that there is no doubt as to their greater intellectual endowments. The civilization of the inhabitants of modern Europe has gone far beyond that of the same people during the middle ages. Their minds are more highly cultivated; but there is no reason to doubt that those of their predecessors some centuries ago were equally capable of cultivation, if the same opportunities had been offered to them. I need not repeat the reference which I have already made to that marvellous people of ancient Greece. The great agent in the promotion of civilization is the advancement of knowledge; and if European civilization at the present day is of a superior kind to that of Greece or Rome 2000 years ago, it is

not because there is a greater amount of intellect, but because we have the advantage of the literature, art, geometry, and moral philosophy bequeathed to us by those ancient nations, with the addition of those inquiries into the phenomena and laws of nature, included under the head of the physical sciences, which the latter had neglected. The cultivation of the physical sciences has not only enabled us to obtain nobler and grander views of the universe, but, in affording us more exact information as to the reality of things around us, has been the means of dissipating many delusions and correcting many errors. This is a subject which we have in some degree discussed formerly; and I shall at present merely call your attention to the fact, that the cultivation of the physical sciences, especially within the last two centuries, has had an important bearing on other departments of knowledge, by introducing a more precise and accurate method of research. History, moral philosophy, political economy, and the science of government have, under this influence, ac-

quired a wholly new character, and thus in various ways has the extension of knowledge greatly contributed to improve the condition of mankind. That the intellectual capacity differs very much in the different varieties of mankind is, I suppose, sufficiently obvious; nor is this very remarkable, if we consider that it corresponds with what we observe in dogs and other animals. Experience justifies the belief that some at least of the inferior varieties of the human species—the negroes for example—are capable of a higher degree of civilization than that which they have hitherto attained; and in our last conversation it was not denied by either Ergates or myself that, in the course of a series of generations, some actual improvement might take place in those respects in which their minds are now deficient: but I can find no facts which would lead me to believe that they would, under any circumstances, rise to the level of the more intellectual varieties, or that there is any law now in operation by which they will be so far elevated as to meet your sanguine expectations of the future.

ERGATES. Nevertheless, something may be urged on the other side of the question. It must be borne in mind, that, looking into the future, there is an indefinite period of time before us, during which, by however slow degrees, in a long succession of generations great changes may be worked out. For reasons which I gave formerly, I have been led to the conclusion that the whole of the human race have sprung from the same original stock; yet how great is the difference which they present as to their intellectual capacities! How then can we venture to say that, in the revolution of ages, some new variety of man may not be produced, as superior to the European of the present day as the European is to the Australian savage?

But here another view of the subject presents itself. Whatever may be the future destiny of man, is he really so perfect that he should be regarded as the crowning-piece of the creation? We have the history of the former inhabitants of our planet, not handed down by tradition, not written in books, but

recorded in indelible characters in the strata immediately below the surface of the earth. We learn from these that numerous forms of animal life existed, in ages which have long since gone by, which have now become extinct; that the first of these which were called into existence were of a simpler kind; and that by a gradual, though by no means regular progression, these have been succeeded by others of a higher and a higher order. Is man to be considered as the last of these productions? or is it not more probable that he does but stand in the middle of a long series, and that in the far distant future there may be a time when, his mission on earth having been completed, he too will be replaced by other living beings, far superior to him in all the higher qualities with which he is endowed, and holding a still more exalted place in the system of the universe? You will say that this is but a vain speculation, from which no practical good can arise, and I admit the justness of the remark. If, however, such unanswerable questions sometimes present themselves to us, it is but the result of a

principle implanted in the human mind for the highest and most beneficial purposes, under the influence of which we are led on in the pursuit of knowledge, some in one direction, some in another, until we arrive at that point where knowledge terminates, and we have to substitute a more or less probable conjecture for a legitimate conclusion. Such conjectures, founded on a reasonable analogy, are not to be regarded as altogether worthless. It is for us to learn where our inquiries should end, and not to bewilder our minds by the endeavour to penetrate into regions beyond the reach of the human intellect.

It was a fine afternoon, and we walked to the railway station, accompanied by our host. As he took leave of us, he said, addressing himself especially to Crites, "I am afraid that you have had but a dull visit. You might certainly have profited more, both as to your health and spirits, if, instead of being cooped up here, you had been breathing the pure air

of a moor in the Highlands. It is probable that none of us are much wiser than we were before our conversations began. Nevertheless, I am led to hope that our time has not been altogether wasted. The subjects which we have discussed have this peculiar interest — that they belong to the incidents of every-day life, and that, such as they are, they are not above the comprehension of the humblest capacity, nor beneath the notice of the loftiest intelligence."

ADDITIONAL NOTES.

Note A. Page 85.

The doctrine of moral insanity, as expounded by the late Dr. Prichard, has been referred to in the former part of this work. The question is one of very grave importance, as bearing on the administration of justice, and there have been not a few occasions on which the misapprehension of it has led a jury to arrive at a false conclusion. The views of Baron Alderson on the subject are so clear, and his reasoning so conclusive, that no excuse can be required for transcribing the entire passage in the charge delivered by that eminent jurist from which the brief extract in the text has been taken.

"In the first place, they must clearly understand that it was not because a man was insane that he was unpunishable; and he must say that upon this point there was generally a very grievous delusion in the minds of medical men. The only insanity which excused a man from his acts was that species of delusion which conduced to, and drove a man to commit, the act alleged against him. If, for instance, a man, being under the delusion that another man would kill him, killed that man, as he sup-

posed, for his own protection, he would be unpunishable for such an act, because it would appear that the act was done under the delusion that he could not protect himself in any other way; and there the particular description of insanity conduced to the offence. But, on the other hand, if a man had the delusion that his head was made of glass, that was no reason why he should kill another man; and that was a wrong act, and he would be properly subjected to punishment for that act. These were the principles which ought to govern the decision of juries in such cases. They ought to have proof of a former disease of mind, a disease existing before the act was committed, and which made the person accused incapable of knowing, at the time he did the act, that it was a wrong act for him to do. This was the rule by which he should direct them to be governed. Did this unfortunate gentleman know that it was wrong to strike the Queen on the forehead? There was no doubt that he was very eccentric in his conduct, but did that eccentricity disable him from judging whether it was right or wrong to strike the Queen? Was eccentricity to excuse a man from any crime he might afterwards commit? The prisoner was proved to have been perfectly well aware of what he had done immediately afterwards; and in the interview which he had since had with one of the medical gentlemen, he admitted that he knew perfectly well what he had done, and ascribed his conduct to some momentary uncontrollable impulse. The law did not acknowledge such an impulse; if the person was aware that it was a wrong act he was about to commit, he was answerable for the consequences. A man might say that he picked a pocket from an uncon-

trollable impulse ; and in that case the law would have an uncontrollable impulse to punish him for it."

Note B. Page 168.

The mathematical calculation of probabilities cannot indeed be properly regarded as forming an exception to the general rule which has been laid down in the text. It is true that it does not lead to any conclusion which is absolutely certain, but the result is so far indisputable that it affords the nearest approach to certainty which, with the existing amount of knowledge, the human intellect can attain.

Note C. Page 226.

However much the advancement of civilization may be influenced by the operation of moral causes, such as may be included under the heads of government, religion, and education, it must be admitted that it is in no less degree influenced by the operation of physical causes also. The results of the great inventions of modern times, such as the steam-engine, electric telegraph, and railways, are too obvious to be overlooked. But we must not therefore lose sight of the fact that a multitude of inventions with which we are now so familiar that they scarcely seem to attract our notice, were in their own day not less important than those which have been just referred to. To the primæval inhabitants of the earth, the rude cutting instruments manufactured from flints were a greater acquisition than the finest steel cutlery is to those of modern Europe. Nor was there any more

important epoch in the history of man than that of the first domestication of the dog, whose faithful services enabled him better to contend with the wild animals of the forest, at the same time that they assisted him in procuring the necessary supply of game for his food. The first wheelbarrow contained within itself the principle of two-wheeled and four-wheeled carriages. But the greatest and most important invention of all was the application of fire to useful purposes: without it the ores of iron and copper which lie concealed in the earth could have been turned to no account; there could have been little or no agriculture, as the grains of wheat, barley, and rice are nearly wholly unfit for the food of man unless subjected to the action of heat. The same may be said of the tubers of the potato and the roots of other vegetables; and here we have presented to us what is perhaps one of the most difficult problems connected with human history. By what experience was it possible for our progenitors to learn the uses of fire, and how was it that they first ventured to employ so fierce and terrible an agent? It may well be a question, indeed, whether this knowledge was the result of experience at all, and whether it was not rather founded on an especial instinct implanted in them for the purpose.

Note D. Page 231.

Condorcet, Progrès de l'esprit humain, chap. x.—"La perfectibilité ou la dégénération organique des races dans les végétaux, dans les animaux, peut être regardée comme une des lois générales de la Nature.

" Cette loi s'étend à l'espèce humaine, et personne ne doutera, sans doute, que les progrès dans la médecine conservatrice, l'usage d'alimens et de logemens plus sains, une manière de vivre qui développerait les forces par l'exercice, sans les détruire par des excès; qu'enfin, la destruction des deux causes les plus actives de dégradation, la misère et la trop grande richesse, ne doivent prolonger pour les hommes la durée de la vie commune, leur assurer une santé plus constante, une constitution plus robuste. On sent que les progrès de la médecine préservatrice, devenus plus efficaces par ceux de la raison et de l'ordre social, doivent faire disparaître à la longue les maladies transmissibles ou contagieuses, et ces maladies générales qui doivent leur origine au climat, aux alimens, à la nature des travaux. Il ne serait pas difficile de prouver que cette espérance doit s'étendre à presque toutes les autres maladies, dont il est vraisemblable que l'on saura toujours reconnaître les causes éloignées. Serait-il absurde, maintenant, de supposer que ce perfectionnement de l'espèce humaine doit être regardé comme susceptible d'un progrès indéfini, qu'il doit arriver un temps où la mort ne serait plus que l'effet ou d'accidens extraordinaires ou de la destruction de plus en plus lente des forces vitales, et qu'enfin la durée de l'intervalle moyen entre la naissance et cette destruction n'a elle-même aucun terme assignable? Sans doute, l'homme ne deviendra pas immortel; mais la distance entre le moment où il commence à vivre et l'époque commune où naturellement, sans maladie, sans accident, il éprouve la difficulté d'être, ne peut-elle accroître sans cesse?

" Comme nous parlons ici d'un progrès susceptible

d'être représenté avec précision par des quantités numériques ou par des lignes, c'est le moment où il convient de développer les deux sens dont le mot *indéfini* est susceptible. En effet, cette durée moyenne de la vie, qui doit augmenter sans cesse, à mesure que nous enfonçons dans l'avenir, peut recevoir des accroissemens, suivant une loi telle qu'elle approche continuellement d'une étendue illimitée, sans pouvoir l'atteindre jamais; ou bien, suivant une loi telle, que cette même durée puisse aequérir, dans l'immensité des siècles, une étendue plus grande qu'une quantité déterminée quelconque, qui lui aurait été assignée pour limite. Dans ce dernier cas, les accroissemens sont réellement indéfinis dans le sens le plus absolu, puisqu'il n'existe pas de borne en deçà de laquelle ils doivent s'arrêter. Dans le premier, ils le sont encore par rapport à nous, si nous ne pouvons fixer ce terme, qu'ils ne peuvent jamais atteindre, et dont ils doivent toujours s'approcher; surtout si, connaissant seulement qu'ils ne doivent point s'arrêter, nous ignorons même dans lequel de ces deux sens le terme d'indéfini leur doit être appliqué; et tel est précisément le terme de nos connaissances actuelles sur la perfeetibilité de l'espèee humaine, tel est le sens dans lequel nous pouvons l'appeler indéfinie."

A doctrine so agreeable to the fancy, so gratifying to human ambition, and enunciated by so eminent an individual, could not fail to attract a certain number of disciples, some of whom were even more sanguine than their master. The alchemists had failed, but the philosopher had diseovered the true *elixir vitæ*. The views of Condorcet were indorsed by Godwin, in his essay on

political justice; but in his case the dream seems not to have been of long duration, as, in a very few years after the publication of that remarkable work, he gave in his romance of St. Léon a graphic description of the discomforts, and even miseries, which might be expected to arise from a life protracted much beyond the usual period. The futility of such speculations, indeed, must be sufficiently apparent to any one who bears in mind that, even under existing circumstances, the tendency of the increase of population is to overtake that of the means of subsistence, and considers to how great an extent any considerable prolongation of the period of human life must, in the course of a few generations, multiply the number of human beings on the surface of the globe.

THE END.

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